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TESTING A MODEL FOR MONITORING AN EDUCATIONAL SYSTEM

by

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A THESIS

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ABSTRACT

This study tested a model which was developed as a guide for the monitoring of an educational system. The specific purpose of the study was to identify variables which should be included in a program monitoring approach and to demonstrate how such variables could be used within an evaluation system designed to monitor the quality of education in on-going school programs.

Theoretical constructs and perspectives were adopted from literature in the areas of program evaluation, social indicator development, educational planning, organizational effectiveness, and information systems. The model developed contained three major phases including: (a) data collection and preparation, (b) inductive inquiry, and (c) information. Existing data were utilized, hence only the last two phases of the model were applied in the present study. These data included information from Alberta Department of Education files and from a followup questionaire for an approximate 10% random sample of all grade eleven students in the province who had been enrolled in the 1970-71 school year.

A total of 20 general indicators of quality education and seven subject area specific indicators were identified from the available data. The greatest amount of variance in these indicators of quality education was accounted for by seven of the 25 student-based and school-based predictor variables utilized. The seven included student program, pupil-teacher ratio, sex of respondent, T-SCAT ability score, grade nine average, self ability rating, and career plans. Up to 56%

of the variance was accounted for by the first five of these predictor variables; this percentage in the case of predicting the high school average mark. Overall, the high school program followed by the student accounted for the most variance in the quality indicators. Although predictability was lower for the externally measured indicators, up to 30% of the variance was accounted for, even though these followup data had been gathered five years after the students left school.

Provincial norms were computed for each indicator of quality education. The general quality indicators provided information such as: that 65% of the student group achieved a high school diploma and that 30.5% attained matriculation status. The general indicators of quality education were disaggregated on the basis of sex of student, previous achievement, career plans, and student program. Further disaggregations of the indicators based on the selected student characteristics were carried out within each of the four student programs. Additional analyses were done using two of the general indicators (percentage of students achieving a high school diploma and the average high school mark) to enable comparisons among nine school districts and 12 schools which had been selected for illustrative purposes.

A general conclusion of the study was that macro evaluations of school programs, of the type demonstrated, have potential in providing useful information for educational program planners and decision makers at the system level.

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CHAPTER 1

INTRODUCTION

Evaluation of school programs at the general systems level requires consideration of approaches advanced in educational planning, needs assessment, information systems, as well as curriculum evaluation. Concepts developed within the study of organizational effectiveness and the social indicator literature must also be considered.

Evaluation activities which are perceived to be summative at one level of inquiry may become formative when the scope of inquiry changes to include a larger frame of reference, or a more general system. The study reported herein focuses on an approach which is formative evaluation at the general level of "schooling". The approach proposed is a continual, periodic feedback of information, providing formative evaluation of an educational system, its on-going instructional programs and its major sub-systems. Such an approach can provide information regarding the quality of the processes and outcomes of schooling and identify areas requiring more in-depth evaluation, such as a curriculum evaluation of a specific subject area or an organizational effectiveness study of a school or school system.

The level of evaluation reported in this study is macro-evaluation, which is the general monitoring or auditing of an educational system, in the sense of a periodic check to determine the effectiveness of that system and the quality of its outcomes.

The Purpose of the Study

The purpose of this study was to test a model for monitoring an educational system which could provide periodic information (ideally on an annual basis) at the provincial, district, and school levels on which to base general curriculum and resource allocation decisions. Such a system could produce selected information taken from a student-based sampling of system files, public opinion, student opinion, student self-report information, and educator opinion.

Ideally, such a system would identify the types and sources of information and outline the analytical strategies and the framework for the presentation of information which could provide each level of the provincial educational system with:

a. indications of the general quality of education,

b. indications of the quality of education within each subject area vis-a-vis provincial objectives,

c. guidance for policy and resource allocation decisions, and

d. direction for further in-depth curriculum evaluations.

Justification for the Study

Very little systematically collected information of a longitudinal nature is available to school authorities to guide their curriculum and resource allocation decisions at the general or "macro" level of the operation of schools and school systems. "One-shot" surveys or opinion polls are conducted, advisory groups are established, petitions are received from various pressure groups, the "pulse" of the electors is felt by politicians, but systematically collected evidence of achievement, of quality, of strengths and

weaknesses, is almost non-existent. The study reported here attempts to examine an evaluative approach which could begin to meet these needs.

Educational Evaluation and Accountability

A trend over the last two decades has been increasing pressure for more accountability in education. There have been the demands for closer specification of educational objectives, the implementation of program budgeting systems, a redefinition of "schooling" to distinguish it from "education", and calls for quality indicators of educational performance.

Studies during the 1960's in the United States resulted in a significant increase in interest in educational evaluation which would give indications of worth at the general or "macro" level. The Coleman Report of the mid-sixties (Coleman, 1966) raised questions about the contribution that various aspects of the school made to student achievement. The National Assessment of Educational Progress (NAEP) of the United States grew out of recommendations from the Exploratory Committee on Assessing the Progress of Education (ECAPE) which had indicated that because of the absence of comprehensive data ... "personal views, distorted reports, and journalistic impressions are frequently the main sources of public opinion" (p. 9). Lessinger (1970) suggested an "educational accomplishment audit" focusing on skill acquisition and, in reply to concerns related to educational costs, wrote:

> It would make much more sense if we moved from the concept of per-pupil cost to the concept of learning-unit cost, and focused on the cost of skill acquisition rather than on the cost of maintaining children in schools. (p. 11)

The Social Indicator Movement

Concerns also developed for social systems other than education, and in 1971 the Economic Council of Canada called for the development of a wide range of social indicators which would give evidence of the well being of all social systems in the country. The Eighth Annual Review of this council (1971) called for the development of a monitoring system and the use of feedback mechanisms which would provide for continuous reassessment and realization of objectives, policies, and programs. The Review makes reference to quantitative and qualitative information collected on a time-series basis to provide "goal indicators." Such a monitoring system could act as an early warning system and provide a bridge between broad abstract goals and operational guidelines.

On an international level, the Organization for Economic Cooperation and Development laid plans for "Indicators of Performance of Educational Systems" (1973) which were summarized as:

> Goals for educational growth and change in the 1970s should be made more explicit and where possible indicators which would measure the performance of the educational system, both in relation to educational goals as such and the contribution of education to the wider social and economic objectives, should be established (p. 103).

More recently, Stake (1976) has observed that "although many completed evaluation studies fell short of their promise, the demand for evaluation in the United States has not diminished" (p. 9).

The Alberta Scene

In Alberta, Worth (1972) espoused a need for effective monitoring of school programs to "evaluate our system of schooling on a systematic and comprehensive basis" (p. 138). With the implementation

of Program Planning Budgeting and Evaluation Systems (PPBES) in the province, such evaluation was provided for, but later the evaluation component was dropped and PPBES became PPBS. Duke (1972), in writing about PPBES and educational accountability outlined the need for clearly specified objectives, evaluation of these objectives, and communication to the public in terms of "what are we doing?" and "how well are we doing it?"

In response to a need for evaluative information of the sort indicated above, steps were taken by Alberta Education in 1970, through the Curriculum Evaluation Project (Collett, 1978), to determine the relevancy of courses taken by high school students to the achievement of their aspirations. The project yielded a data bank with potential for analysis beyond the purposes of the original study.

The data bank for the Curriculum Evaluation Project (CEP) contained complete Department of Education records for a group of approximately 2700 students randomly selected from the total Alberta grade eleven population of 1970-71. In addition, the data bank included student feedback of a longitudinal nature (through the administration of three questionnaires distributed over a seven year period) providing important follow-up data, and individual evaluations of schooling. The sample had been structured with sub-samples large enough to provide information for individual high schools. The resulting data bank is large enough to enable the researcher to undertake statistical analyses of variables which could be included in an educational monitoring system.

Continuing concern regarding educational system evaluation is still evident. Recent media reports have focused on the question of

once again implementing annual departmental examinations for secondary students in the province. Such examinations could provide evidence of how well individual schools are doing and, more generally, how well the schools of the province are doing. The Minister's Advisory Committee on Student Achievement (MACOSA) has made recommendations regarding the periodic implementation of province-wide achievement tests. Such recommendations, however, focus only on student grades and overlook other, broadly-based, indicators of achievement and evaluations of the effects of schooling. Examples include the extent of achievement of system goals and objectives, student attainment of a high school diploma, employability, job satisfaction, etc.

In summary, there is an apparent need for an evaluative approach which would utilize a cross-section of indicators, rather than one which focuses on a single indicator such as grades achieved by students. Such an approach would provide a synoptic data base (providing a general view of the whole educational system), with a variety of indicators on the quality of education. The indicators would show strengths and weaknesses in particular subject areas of the curriculum as well as in particular sub-groups of the student population. Such information would ideally lead to more informed curriculum and resource allocation decisions.

The Research Problem

Within the direction established earlier in the discussion of purpose, this research study sought to partially test a model for monitoring an educational system and to identify data and data handling procedures which could provide an informative and evaluative

set of general and subject area quality indicators. Such quality indicators, when appropriately disaggregated, could be used to monitor the provincial educational system and major sub-systems within the province, including schools and on-going curricular programs at the macro level of evaluation.

Utilizing the longitudinal and file data within the Curriculum Evaluation Project data bank, the problem was to identify variables which should be included in a program monitoring approach and to demonstrate how such variables could be used within an evaluation system designed to monitor the quality of education in on-going school programs.

Sub-Problems

In addressing the above problem, the research was directed toward the following more specific sub-problems:

1. to identify general and subject area indicators of quality education;
2. to identify student-based and school-based variables which account for significant variance in the indicators of quality education;
3. to determine, for selected indicators of quality education, the total variance which is accounted for by the student-based and school-based variables and the explanatory power of each of these variables;
4. to compute provincial norms for each indicator of quality education;
5. to identify, for selected indicators of quality education,

differences among groups of students classified on the basis of student programs and student characteristics;

6. to develop profiles for selected schools and districts using the various indicators of quality education.

Delimitations

In using the data bank of the Curriculum Evaluation Project, this research is delimited to the data that were included in that study. Specifically, the CEP was delimited to the high school programs of Alberta. Grade eleven students registered in Alberta schools during the school year of 1970-71 were identified as the population to be studied. Data sources were delimited to Department of Education student records, school A-Card reports, a grade 11 student questionnaire, and two followup surveys.

This thesis was further delimited to the variables within CEP which could be identified as potential quality indicators, and to others which potentially would be required to disaggregate the quality indicators. As a result, a number of the questionnaire variables which dealt with student opinion concerning the quality of their educational experience were eliminated as were the variables concerned with student views about the importance of the various goals and school programs.

On the other hand, student outcome data such as the distribution of marks, which were in the data bank but not used by CEP, were selected for inclusion in this study.

Limitations

Social research, especially of the longitudinal type, is limited by the almost infinite number of unidentified contaminating variables which cannot be taken into account. Nevertheless, if the results of such longitudinal research are interpreted with this in mind, progress can be made toward understanding relationships between earlier and later events.

Limitations of the Curriculum Evaluation Project

Major limitations of the Curriculum Evaluation Project included:

a. the effectiveness of the questionnaire used in collecting accurate and honest feedback from students, and

b. the less than optimal return rate (27%) for the third questionnaire mailed to students five years after they left high school.

Further Limitations

The limitations imposed on any study which depends upon existing data were operative in the present study. For example, no changes could be made in the data gathering procedures used. Another limitation was imposed by the age of the data which were collected three years prior to completion of the present study.

Assumptions

The underlying assumption of this research was that because of the complexity of the general area of evaluation at the macro level, one way to aid advancement and further development of macro evaluation was to undertake one, which in turn would provide a base line study

for subsequent refinements in the development of a viable system.

Furthermore, it was assumed that accurate evaluative judgements of goal achievements can be collected from ex-clients of the school by means of a questionnaire.

Definitions

The following definitions of terms are included to assist the reader in understanding the report of this study.

Monitor. The periodic collection and presentation of information on the quality of education generally, and on the quality of sub-systems and curricular programs.

Audit. Used synonymously with monitor, excluding one recent usage of the term which focuses on a specific type of meta-evaluation process.

Quality Indicators. A comprehensive, yet limited set of policy-related and goal-based statistics (variables) which can be collected periodically and disaggregated to the level of significant sub-systems and client sub-groups, in order to reveal trends and fluctuations.

Disaggregate. To compute the numerical value of a quality indicator for a specified sub-group of students.

Program. The curricula offered by a school, or a subject area component of that curricula. In this sense, the "school program" may be referred to, or the "mathematics program" (as an example) may be referenced. Alternatively, program is used to refer to a group of curricular experiences (courses) taken by a student or group of students, which comprises their "student program".

Organization of the Thesis

The first chapter of this thesis has presented the purpose and justification for the study. The research problem was outlined along with specific sub-problems which guided the research and provided the structure for the remainder of the thesis. The chapter included the delimitations, limitations, assumptions, and definitions associated with the study. In Chapter 2 the theoretical background and conceptual framework of this research is presented, along with a model for monitoring educational systems, designed by the author. The model for monitoring an educational system is proposed as a type of on-going exploratory research, providing formative evaluation at the system level. The theme of the model is a cyclical monitoring of the educational system as well as the process of monitoring.

In Chapter 3 the Curriculum Evaluation Project which provided the data bank for the present study, is reviewed. The focus of the review is on the sample structure and the data collection methodologies used and not on the findings of that particular project.

The methodology of the present study is described in Chapter 4. The research questions are stated and the research procedures for each question reviewed.

Chapters 5 and 6 present the results of the study. Chapter 5 deals with the findings associated with the first three sub-problems which represent the inductive inquiry phase of the study. The sub-problems were concerned with:

a. identifying both general and subject area quality indicators,

b. identifying the student-based and school-based variables which

account for the significant variance in the quality indicators, and

c. determining the total variance accounted for, along with the relative explanatory power of each of the student-based and school-based variables.

Chapter 6 presents the results for the last three sub-problems which form the information phase of the study. These sub-problems were concerned with:

a. the computing of provincial norms for both general and subject area quality indicators,

b. identifying the different levels recorded on selected quality indicators by groups of students classified on the basis of student programs and student characteristics, and

c. developing profiles for selected schools and districts using the quality indicators.

Finally, Chapter 7 summarizes the study and presents the study conclusions and implications.

CHAPTER 2

CONCEPTUAL FRAMEWORK AND MODEL DESIGN

The conceptual framework for the study grew out of a particular perspective on social research generally. Within this general research orientation, certain perspectives on evaluation, along with concepts and strategies from a variety of other disciplines, contributed to the development of the model presented in this chapter.

Since the macro evaluation perspective adopted in the present study relies on the consideration of brief summary data, quantitative evaluation has been emphasized. Evaluative perspectives and techniques having a qualitative emphasis have not been reviewed in detail. The assumption made was that these techniques are more appropriate for specific and detailed evaluation than they are for general "macro-level" monitoring.

In the first part of the chapter, a brief elaboration of the general research orientation taken in the study is presented. Second, a variety of concepts is reviewed in order to assist in the identification and description of the particular evaluation perspective adopted. Third, several strategies taken from the evaluation literature and from other fields of study concerned with evaluation are presented. Examples of these fields of study are organizational effectiveness, educational planning, information systems, and social indicator development. In the fourth section of this chapter, concepts and strategies are brought together in a presentation of a systems evaluation perspective within which the

model was developed. A model which could be used to guide program monitoring at the system level is then presented.

Evaluative Research: a Philosophical Viewpoint

Within the domain of general scientific inquiry, Worthen and Sanders (1973) demonstrate that considerable overlap exists between the two fields of educational research and educational evaluation. Basic research seeks to increase knowledge, and applied research seeks solutions to problems. Evaluation, like applied research, collects information but toward a specific question concerned with the value of something. While a number of authors (including Worthen and Sanders) have identified characteristics which distinguish between research and evaluation, the theoretical orientation taken in this study is based on the similarities between research and evaluation rather than on the differences.

The research reported herein is the type of research which has variously been referred to as formative research evaluation, sociological inquiry, or inductive research. The following paragraphs explain.

Inductive Sociological Research

A developing view in the field of social research is that one legitimate objective of data analysis should be the discovery and formulation of propositions (Sonquist, 1970). According to this view, social research has an exploratory role to play as well as the more traditional role of hypothesis testing. Sonquist states:

> The problem is one of determining which of the variables for which data have been collected are actually related to the phenomenon in question, and under what conditions and through which intervening processes, with appropriate controls for spuriousness (p. 1).

Rutman (1977) describes the characteristics of "formative" research as an inductive approach aimed at discovery. He suggests that a formative research evaluation "...is considered as an on-going process which guides decisions about program changes" (p. 71).

Writing of "sociological inquiry" as "nonexperimental inquiry directed toward the study of relations among 'social variables'" (p. 144), Kerlinger (1979) states: "Sociological inquiry, then, is a large and highly significant part of contemporary behavioral research" (p. 157).

In the present study, the orientation described above is evident in two ways:

a. as an exploratory research project aimed at discovering appropriate ways of monitoring on-going school programs, and
b. in the adoption of an inductive inquiry phase <u>within</u> the proposed program monitoring model.

This second point is elaborated on later in the presentation of the model. In the next section, a number of concepts which can help to identify and describe various evaluation perspectives are reviewed.

<u>Identifying and Descriptive Evaluation Concepts</u>

What is the scope, the focus, the domain of evaluation as a field of study? A review of the literature over the last 20 years shows a wide variety of answers to this question. Differing perspectives, determined partly by a particular theoretical orientation and partly

by the type of evaluative problem confronted, have contributed not only to different descriptions of what evaluation is, but also to considerable confusion in terminology.

A number of well known theorists in the field of evaluation such as Taylor and Cowley (1972), Worthen and Sanders (1973), House (1973), and Payne (1974) have gathered writings which present a variety of perspectives in order to clarify viewpoints and terminology through comparison. Other authors have developed various typologies in order to rationalize evaluation as a field of study. Some classifications by authors such as Stufflebeam (1968) or Anderson and Ball (1978) suggest that evaluation activities could be categorized based on the type of decision served. Morris and Fitz-Gibbon (1978) grouped evaluation perspectives on the basis of emphasis placed on goals, decisions, or research, etc. Hastings (1969), Anderson and Ball (1978), and Rossi, Freeman, and Wright (1979) have developed two-dimensional matrices for use in categorizing evaluation perspectives.

The different concepts associated with the field of evaluation are too many and too complex to be handled in a single matrix. The following section reviews and discusses a number of underlying, and sometimes overlapping, evaluation concepts that have been identified by various authors. Many of these concepts deal either with different purposes or different methodological emphases associated with a particular evaluation. In some cases purpose and methodology are interrelated.

These concepts were used to help identify the particular perspective of evaluation used within this study.

Goal and Role

A major contribution to understanding the purpose of evaluation has been made by Scriven (1967) in his discussions of the role and goal of evaluation. The goal of evaluation is to determine the worth of an educational unit. As interpreted by MacKay and Maguire (1971), the role of evaluation is broken into two broad categories by two other concepts advanced by Scriven, namely formative and summative evaluation. The major purpose of formative evaluation is improvement. It is an evaluative approach suited for the development of new techniques or programs, or as an on-going developmental approach. Summative evaluation, on the other hand, has been defined as a "final" or terminal evaluation of the worth or effectiveness of competing instructional programs. Glass (1972) seems to equate formative evaluation with the role of evaluation, as do MacKay and Maguire, but treats summative evaluation as a further elaboration of the goal of evaluation.

Goal/Objective Orientation

Different perspectives on evaluation have often been based on different views as to the role that goals and/or objectives should play in the evaluation. Positions range from a pure application of Provus' (1971) discrepancy model of evaluation to the goal-free position advanced by Scriven (1972).

Intrinsic and payoff evaluation. A pair of concepts advanced by Scriven (1967) and discussed for example by Tyler (1967) and Friesen (1971) differentiate between intrinsic and payoff evaluation. An emphasis on the effects of an instructional unit relates to a "payoff"

evaluation. Intrinsic evaluation however focuses on content, goals and procedures of the particular educational unit under study.

Discrepancy evaluation. Primarily under the influence of Tyler (1969) and Provus (1971), evaluation was to focus on developing objectives, identifying the extent of achievement of those objectives and determining the degree of shortfall. Guba (1969) has criticized this kind of an approach as focusing on behavioral changes and as a result placing an emphasis on terminal evaluation. Calling into question the practicality of focusing on goals, March (1972) observed: "...it seems to me perfectly obvious that a description that assumes goals come first and action comes later is frequently radically wrong" (p. 420). He goes on to suggest alternatively, that evaluation needs to examine what was done in terms of what is currently believed to be important.

In spite of criticism, emphasis on goals or objectives has continued to varying degrees and is involved, to some degree, in most perspectives on evaluation. Terminology varies, with Stake (1967) introducing the concepts of intended and observed outcomes, and others using the term "impact" which is used as a longer range goal than an outcome.

Decision Types Served

The focus of the CIPP evaluation model developed by Stufflebeam (1971) is the type of decision to be served by the evaluation endeavor. Stufflebeam's model develops in detail: context, input, process, and product evaluation for the purpose of providing information for four types of decisions. The four corresponding

categories of decisions advanced are respectively, planning decisions, structuring decisions, implementing decisions and recycling decisions. Of the major theoretical constructs within educational evaluation, the CIPP model thus embodies a significant reference to perspective within the model.

Three of the six broad categories of purpose identified by Anderson and Ball (1978) deal with the type of decision served. They suggest that the purpose of evaluation may be to contribute to decisions about (a) program installation, (b) program continuation or expansion, or (c) program modification. The three other potential purposes of evaluation include (a) rallying support for a program, (b) rallying opposition to a program, or (c) contributing to the understanding of the basic process.

Paralleling decision types somewhat, Rossi et al (1979) identify evaluations for program planning and development, monitoring, impact, and cost-benefit purposes.

Methodological Orientation

The emphasis placed on the type of methodology to be followed has in many cases had significant influence on the nature of a particular evaluation perspective. Some writers have even used the type of methodology as a basis for categorizing evaluative approaches. Wrightstone, in Essex (1969), identified six types of evaluation, namely, field orientated, laboratory studies, implementation studies, controlled experimentation, longitudinal studies, and case studies. The four major categories of evaluations advanced by Apple (1974), included the following:

a. anthropological approaches - using naturalistic models of research from anthropology,

b. empirical methods - using research designs, regression analysis, statistical and measurement error analysis,

c. secondary evaluations - using a central data bank, focusing on re-analysis of primary data, posing new questions of the same data, or combining multiple data sets, and

d. process evaluations - using correlational techniques leading to causal conjecture from measures of home environment, parental pressures, expenditures, class size, teacher experience, etc.

In an AERA monograph, Kraft et al (1974) offered the following "interdisciplinary" approaches to evaluation:

a. the field study using anthropological techniques focusing on processes or transactions,

b. the systems based economic or cost-value approach,

c. a literary narrative approach, usually process oriented, and

d. the "portrayal" or overview approach which is a continuous and pervasive perspective such as the countenance model by Stake.

A more research based categorization is used by Anderson and Ball (1975) who identify experimental, quasi-experimental, correlational, and survey types of evaluation methodologies. These methods are cross referenced with the different purposes of evaluations for a matrix approach to categorizing evaluations.

Other methodological positions. Recent approaches to evaluation have focused on some new methods which recommend bases for a particular evaluative perspective. One of these is the adversary

method which is a quasi-legal approach to determining the value of a project or program or other educational unit. Other recent writers have emphasized methods which focus on the identification of quality as contrasted with quantity measures. Often these views are advanced as justification for subjective rather than objective evaluations. The view adopted in this study holds that quality can be described in quantitative terms.

Accountability and Equality of Opportunity

Evaluation as an attempt to demonstrate accountability gained importance during the 1970s. Lessinger (1970) pressed for what he called an "accomplishment audit" of our educational institutions in order to demonstrate the equality of our educational endeavors. In this case, the purpose of evaluation is focused on demonstrating productivity and efficiency.

Often, an emphasis on accountability as a purpose for evaluation results in a narrowing of considerations to quantifiable elements, and productivity may become the ratio of outputs to inputs. Performance contracting, merit pay, and the voucher system have been advanced as ways of promoting accountability as they adopt the "market place" approach to the evaluation of an educational unit.

In a similar vein, the purpose of some educational evaluations has been to focus on inequalities of opportunity. Coleman's early report (1966) is now considered a classic example of such an emphasis. The primary purpose of evaluation from this perspective would be the elucidation of the equality of educational opportunity.

Political Nature

One recent author draws attention to the inherent "political" nature of the evaluation as an important descriptor of any particular evaluative approach. An evaluation can either be bureaucratic, autocratic, or democratic according to MacDonald (1976). He points out the potential problems with the way in which evaluation may be viewed by those involved. Emphasis is placed on the positive involvement within the evaluation of the participants in the educational system.

Role of Judgement

Should the evaluator pass judgement, or is this the domain of the decision maker or policy maker?

The answer to the above question is significant in describing the perspective of a particular evaluation. Some authors say "no", the evaluation should only provide the relevant information; others suggest that the essence of evaluation is in placing "value" and that this involves passing judgement; while a third mid-range position is that the evaluation should identify alternative positions from which the decision maker could choose in making the judgement.

In summary, the foregoing evaluative concepts have been reviewed from the literature in order to provide a basis for presenting the conceptual framework adopted for this thesis. In addition to these evaluative concepts a variety of approaches or strategies, from a number of disciplines each involved in evaluation, are briefly outlined in the next section. Subsequent sections present a systems evaluation perspective and a proposed model for monitoring, utilizing

the concepts and approaches reviewed here.

Complementary Evaluation Approaches

Program monitoring at the macro level focuses on gathering evaluative information about on-going programs. As such, program monitoring complements other, less macroscopic, evaluative approaches. Each of these approaches or strategies is referred to in this section.

The literature relating to two of the above approaches, curriculum evaluation and social indicators, has contributed most to the development of the conceptual framework and model for this thesis. These are reviewed in some detail.

The gathering of information concerning quality (the value of outcomes and the effectiveness of transactions) of the public school program in general and of major program components has been approached through a variety of perspectives advanced by different related fields of study.

Educational planners propose and develop new educational program components based either implicitly or explicitly on evaluations of the on-going program (needs assessment). Organizational effectiveness analysts examine schools, with a primary view to evaluating the organization, but in so doing also evaluate the programs within the school. Curriculum evaluators are involved in activities which include gathering evidence concerning the value of specific curriculum materials, evaluations of a specified subject area curriculum, or ethnographic evaluations of particular operations. Information system specialists develop information storage and retrieval systems not only to facilitate the on-going school operations but also to provide

summary data of an evaluative nature. International and national developers of quality of life indicators include indicators on the quality of education. Analysts of organizational decision making processes emphasize the need for information, and propose methods for gathering such required information. Educational researchers conduct detailed inquiries into questions of quality, based on personal interests, institutional needs, or public pressures.

Each of the above groups has developed different "models" and approaches. Different terminology, the overlap of activities, and unclear conceptualizations of the interrelationships among these fields of study have perhaps retarded the development of evaluation as a field of study in its own right.

However, the perspective of each of these fields of study is important to the monitoring of educational systems and on-going programs because of the complementary role each of them has with the monitoring function. Firstly, monitoring of on-going programs, being of a general nature, identifies the need for further study through one or more of the above disciplines. Therefore, the nature of the information produced would reflect the needs of each of these interest groups. Secondly, these fields of study often include within their evaluations, information gathered at the macro level which would be useful within a monitoring system.

Curriculum Evaluation Models

While evaluation models, as they have been applied, almost always focus on a specified segment of a school system over a specified time period as in the case of projects, they nevertheless provide a useful

conceptual guide for meeting the needs of educational decision makers at the general level. The generally accepted reason for any evaluation model is to provide a framework which can assist the evaluator in identifying, analyzing, organizing and reporting data gathered for judgemental purposes. Of the evaluation models developed, that advanced by Stake (1967) has most influenced the development of the conceptual framework for the present study.

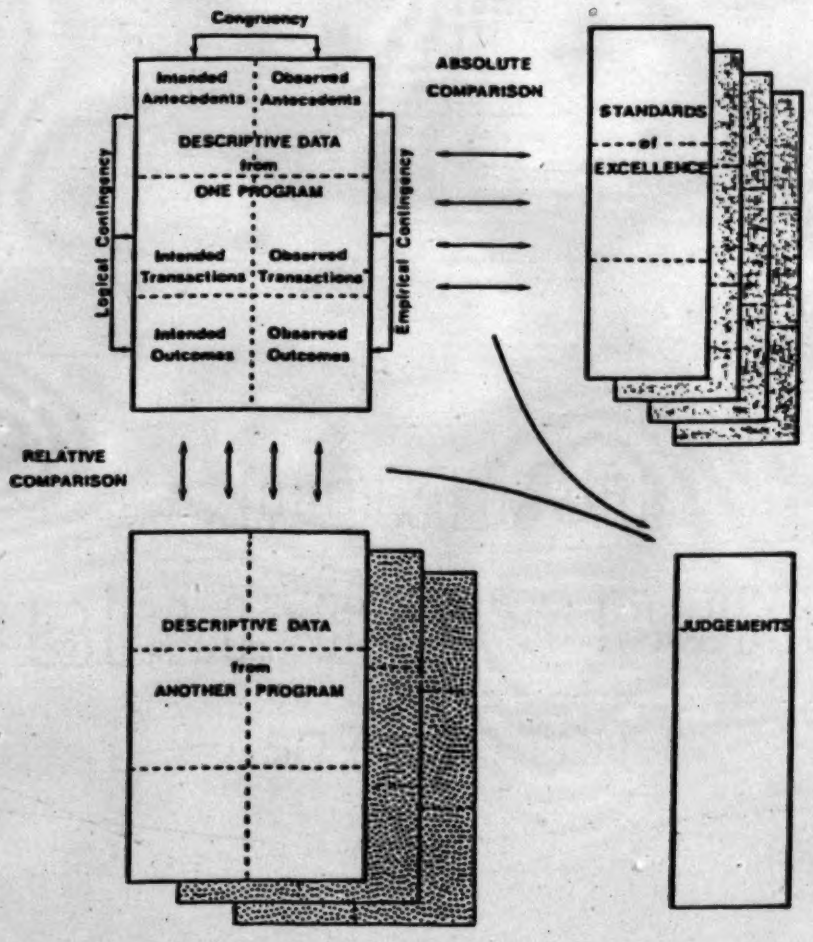
Stake model. The model proposed by Stake (1967) is presented in Figure 1. The model essentially separates data into six categories. In one dimension data are separated into three categories, (a) the antecedents or the "givens", or that which precedes the system's operations, (b) the transactions or the descriptions of what exactly takes place during the operations, and (c) the outcomes of the system. On the second dimension, Stake suggests separating data into two categories: (a) intended or that which "should be" and (b) observed or that which "is" or "was."

Stake's model also suggests the development over time of standards of excellence, or indicators that could be used for comparative purposes if the model were used in a recurring application. The role of judgements is also displayed.

The CIPP model. As mentioned earlier, the PDK evaluation model advanced by Stufflebeam (1971) emphasized evaluation for decision making. A type of systems model, four categories of decisions were suggested as being sequential during the life of an educational project. Planning decisions dealing with intended ends were to be served by context evaluation. Structuring decisions dealing with intended means, were to be provided information by input evaluation.

Figure 1

A REPRESENTATION OF THE PROCESS OF JUDGING THE MERIT OF AN EDUCATIONAL PROGRAM:



Source: Collett, D. J. Curriculum Evaluation Project. Edmonton: Alberta Education, 1978.

Process evaluation provided information for implementing decisions in order to utilize, control and refine procedures. The fourth type of evaluation was of a summative nature providing judgements and reactions to the actual attainment of ends and providing for recycling decisions.

The discrepancy model. Provus (1971) has previously been referenced for his emphasis on goals and objectives. The model advanced by Provus however, focuses on the identification of the difference between goals and achievement of those goals. The main function of evaluation is to identify the discrepancies between what was intended and results obtained.

Contribution. While the model proposed by Stake presents a good overview and identifies interrelationships of components which should be addressed, the operationalization of this model has proven very difficult. One reason the model has not been adopted to a great extent may be because of its apparent emphasis on "hard" data. The model therefore has not been applied directly in the present study. However, the categorizations of data into antecedents, transactions, and outcomes has been adopted. In addition, the concept of establishing standards of excellence and the general system wide overview suggested by the Stake model have contributed to the development of this study. In the terms advanced by the CIPP model, this study focuses on the recycling decision, but views the type of evaluation as formative rather than summative when applied to an on-going school system. While focusing on goals, objectives and other outcomes, this study adopts the view of March (1972), referred to earlier, namely that goals and objectives should be judged on what is currently believed important rather than the approach suggested by the discrepancy model of Provus.

Social Indicators

Work on the development of social indicators, especially that

related to education, has most notably been carried out by the Economic Council of Canada (Greenberg, 1974), O.E.C.D. (Carr-Hill and Magnussen, 1973), the U.S. Department of Health, Education and Welfare (Cobern, Salem and Mashbin, 1972), and by the National Centre of Educational Statistics (1975). Each of these has developed different sets of indicators, partly because of the various levels at which they function. For example, the O.E.C.D. is interested primarily in comparisons on an international basis, while the Economic Council of Canada and the U.S. Department of Health, Education and Welfare are interested in data for a given country. The interests in the present study are focused on indicators which provide information for the provincial and school district levels of administration.

Aims of social indicators. In an attempt to aid in the understanding of social indicators, the O.E.C.D. (1976) has suggested that regardless of the specific perspective, all indicators have the following aims:

a. to provide guidelines for the development of measures to fill the gaps in existing knowledge about socio-economic conditions;
b. to link various measures so as to provide a picture not only of the relevant phenonema, but also of the relationships between them; and
c. to reduce information overload through concentration on relevant indicators and supporting data (p. 11).

Characteristics of social indicators. Henderson (1974), Carr-Hill and Magnussen (1973), Andrews and Withey (1976), and Park and Seidman (1978) have all reviewed numerous definitions of social indicators which collectively include the following characteristics:

a. concepts central to the generation of an information system,

b. measurements of the performance of a social system,

c. relevancy to policy, showing long-term trends and unusually sharp fluctuation rates,

d. "time-series" data or statistics which can be monitored over time,

e. quantitative and qualitative information of a limited yet comprehensive nature,

f. descriptors of goal achievement which can be disaggregated to show the social distribution of these achievements, and

g. diagnostic of the components of the social processes within the system.

The fewer indicators there are without missing important information, the better. Parsimony of indicators for the particular system level being referenced is important. As the Economic Council of Canada has stated in its Eleventh Annual Review (1974), provision should be made for

> ...certain summary or <u>principal</u> social indicators (largely output-orientated) that would synthesize and represent the overall situation with respect to a given area, taking external interactions into account (p. 13).

This viewpoint suggests various levels of specificity of indicators, focused on various levels of curriculum or various institutional levels, yet with a view to combining sets of indicators into "principal" indicators for a more general monitoring report.

In education, many of our important outcome variables are not measureable until many years after the student-clients have left school, but the evaluative information is needed as soon as possible. Therefore, where possible, current indicators of future outcomes are required. This may be achieved through the identification of

relationships, if any, that exist between measures of quality taken internal to the system and those longer range measures which must be taken external to the school system.

Steps in developing social indicators. The O.E.C.D. (1976) lists guiding principles in the development of social indicators including: validity, disaggregation and aggregation, inter-temporal comparability, understandability, availability of data, and links and overlaps. A more succinct approach to the development of social indicators is outlined by Henderson (1974) who identifies five steps:

a. identify the system and sub-systems,

b. identify and taxonomize the outputs of the system,

c. determine input and process factors which have a real influence on outputs,

d. determine the impact of specific programs and policies on outputs, and

e. determine the relative importance of the outputs.

Contribution. The aims identified in the social indicator literature have contributed to the perspective for monitoring an educational system, which is presented later in this chapter. The characteristics referred to have influenced the type of variables selected and the way in which they have been handled. The steps proposed for developing social indicators have contributed to the establishment of the various stages within the model presented later.

In addition to the contributions from evaluation models and the social indicator literature, the disciplines of educational planning and of organizational effectiveness also have contributed significantly to the development of the model for monitoring an

educational system. Each of these areas are concerned with evaluations of a more in-depth nature than proposed by the monitoring function. Each however have complementary roles and are reviewed in the following paragraphs.

Educational Planning

Literature in the field of educational planning has dealt extensively with evaluation.

Beeby (1969) edited a collection of writings on the "qualitative" aspects of educational planning. Significant reference is given in a number of articles in this collection, to the development and use of indicators of adequacy and quality, both direct and indirect, that would be of use to planners.

Kaufman, in his writings on educational planning (1972 and 1979) dealt extensively with the need and role of indicators of goal achievement and needs assessment in planning. The view of Kaufman is that any variable that can be shown to be representative of a later goal achievement can be considered an indicator. The position that is adopted in the present study differs somewhat from Kaufman's view on the nature of social indicators. It follows more closely the influence of the social indicator literature referred to earlier, that indicators should be goal referenced statistics or, in Stake's terms, outcomes.

The present study has many of the characteristics of a needs assessment. The main difference is the macro perspective adopted here. The purpose of the model outlined later in this chapter is to provide the equivalent of an early warning system which could be used

to identify areas requiring more in-depth needs assessments.

Organizational Effectiveness

The emphasis, within organizational theory, on different types of organizations and the particular characteristics of schools, have relevance to program monitoring. Thompson (1967) has categorized schools as organizations with ambiguous outcomes and incomplete beliefs about cause and effect. In a similar vein, Perrow (1970) refers to schools as "non-routine" with unanalyzable problems and many exceptions. While both Thompson and Perrow, along with Katz and Kahn(1966), used their analyses of organizations to support an evaluative approach based on identifying the characteristics of "healthy" organizations, they did point to the need to gather data from reference groups when evaluating organizations such as schools. This is consistent with Blau and Scott's (1962) identification of the client as the prime beneficiary in service organizations such as schools and therefore the focal point of evaluative information. These concepts are accepted as partial justification for the emphasis in this model on client evaluative feedback via the followup method.

Recently, Miles (1980) outlined an ecological model of organizational effectiveness which "...emphasises the importance of institutionalizing a mechanism within the organization to monitor organizational effectiveness over time" (p. 385). He points out that evaluative information must focus on both goals and processes, gathering information primarily from referent groups.

Contribution. The monitoring function adopts the emphasis of organizational effectiveness theorists on the client when evaluating

human service organizations. In a limited sense, compared to the more in depth organizational effectiveness evaluations such as those proposed by Mott (1972) or Steers (1977), the monitoring system focuses on the productivity or goal optimization functions as outlined by these authors.

Information Systems

Program monitoring approaches should be closely articulated with, draw from, and contribute to existing data banks. Many of the systems models display the importance of developing data banks and using these for evaluative purposes.

The following section outlines in more detail the systems and evaluation framework which provides structure to this study.

A Systems Evaluation Perspective: at the Macro Level

In approaching the development of a monitoring model, the literature referenced has contributed to a conceptual framework of:

a. the nature of the phenomenon to be evaluated (the educational system), as well as

b. the nature of the process of evaluation.

Generally, the perspective adopted is a systems model of the educational activity and a macro level of monitoring the quality of education. This section presents particular systems and evaluation perspectives.

A Perspective of the Educational System

Through the influence of evaluation models such as those of Stake and Stufflebeam and systems theorists such as Van Gigch (1978), a

systems view of education has been adopted. In this view, teachers, curricula, and facilities with certain antecedent characteristics are brought together with students who have their own antecedent characteristics, resulting in transactions within the school producing certain educational outcomes for the student.

However, different organizational levels exist upon which to focus the evaluation. Further, the transactions within the school are too varied to take the "black box" approach to evaluation. Gathering evaluative information about high school students with the assumption that they have all had similar experiences (transactions) is erroneous. Therefore the systems approach adopted, draws specific attention to the organizational dimension as well as to the specification of the transactions from the students' experience, or what may be termed a curricular dimension.

Organizational dimension of evaluation. The evaluation perspective changes depending upon the organizational level which is the focus of the evaluation. For example, Hastings (1969) identified the various levels of evaluation as being (a) teacher, (b) local school, (c) local system, (d) state system, and (e) national project.

Forehand (1971) has drawn attention to just two levels of evaluation. The first, project evaluation is viewed as formative evaluation and takes place within the process of curriculum development. A second level of evaluation is seen by Forehand as a diagnostic system, establishing standards and identifying regions where attention is needed. He describes institutional evaluation as considering: "...the achievements of any particular program in relation to a network of other programs and goals, a function that

cannot be performed at the project level" (p. 582). The comments of Forehand are particularly noteworthy when it is considered that most of the models for educational evaluation that have been developed, have in one way or another been associated with evaluations for various nationally sponsored educational projects.

Approaches not differentiated by institutional level, have been identified earlier by Guba (1969) as one of the failures of educational evaluation. He pointed out that the evaluators' traditional point of focus has been microscopic and that as we have shifted our perspective toward a more macroscopic level, the techniques, instruments, and procedures have often proven to be inappropiate.

The curricular dimension in evaluation. While the educational unit under evaluation may be an organizational unit, the particular program or curricular unit focused on will also determine to a large extent the nature of the evaluation envisaged.

Various state assessments (e.g. Michigan Educational Asessment Program) seemed to accept grade as the program level. In these evaluations, the unit of learning is the total experience for the year. The perspective could be more microscopic and consider for example, the contribution of a specific subject, or a more macroscopic view could be adopted considering for example, the contribution of the entire public school program as a unit. One problem with the evaluation segment of the PPBES pilot project in Alberta arose because the particular program definitions chosen had no correspondence to an identifiable learning activity in the schools as experienced by students. While it was possible to assign costs according to the

particular "programs" identified, it was impossible to identify benefits from "programs" which in many cases were theoretical constructs for the purpose of cost accounting.

An Evaluation Perspective

The monitoring of on-going school programs focuses on policies, programs and institutions of the educational system. Evaluation at the system level has as its main role the processing of information for the policy maker and the educational planner providing the basis for gaining support for the educational program and contributing to the understanding of the process. The evaluation of the educational system is differentiated by Johnstone (1978) from either the evaluation of educational curricula, educational projects, or the evaluation of individuals. Johnstone identifies two main purposes for system evaluation:

a. current status analysis, and

b. diagnosis and recommending decisions.

The monitoring role adopted within the present study focuses on the current status analysis purpose. As suggested by Johnstone, a heavy emphasis has been placed on the use of indicators in filling this role, which can "provide a gestalt of a system's operation and development" (p. 255). Indicators are not variables measuring gross quantity but should rather be one of: (a) rates, (b) percentages, (c) averages, (d) differences, or (e) ratios which either aid, or contain within, comparisons of one quantity to another, or to a base quantity.

The macro perspective proposed adopts the following positions with respect to the concepts identified earlier.

1. Goal orientation. Heavy emphasis is placed on goals and objectives which form the basis of provincial curriculum leadership. Goals and objectives move into the public domain facilitating the public documentation of the achievements of the public school system. Goals are evaluated in terms of present views of what should be.
2. Decision types. Collecting evaluative information in a format suited to the target decision maker is important. The macro level of decision making is recognized. This includes the public, who provide financial and other support for educational programs. The monitoring function focuses on recycling decisions, decisions of continuance or modification in the terms of Stufflebeam (1971) and Anderson and Ball (1978).
3. Methodological orientation. Primary data sources for program monitoring is envisaged as existing school files and periodic sampling of ex-clients of schools through a longitudinal design. Program monitoring must include a recurring inductive inquiry phase.
4. Accountability and equality of opportunity. A major purpose of program monitoring is to open the priorities and achievements of the schools to the public. In so doing, information is provided which allows for accountability in terms of goals, objectives, and other outcomes and the presence or absence of equal opportunity may be demonstrated.
5. Role of judgement. The main function of monitoring is the provision of information for top level policy makers, curriculum planners and the public.

6. Organizational level. Data are collected at the provincial level and disaggregated to the next two major levels of decision making, namely the school districts or counties, and the schools.

7. Program. In monitoring the effects of schooling, continuing emphasis must be placed on distinguishing more clearly the "program" or specific school experiences that students have undergone in reaching their respective achievements. Care must be taken to differentiate programs "offered" by schools and programs "experienced" by students. The former often are representative only of administrative units within the school.

8. Categorization of variables. The process of changing collected variables into evaluative information is aided by appropriate categorizations of the variables. A loose adherence to systems models, such as that of Robert Stake, can aid the evaluator not only in the identification of data that should be collected but also in the way it should be analyzed and disaggregated in order to be more meaningful.

9. Needs assessment. Educational system monitoring of programs is a type of on-going needs assessment at the macro level, but does not replace the more in-depth needs assessment that may be required from time to time.

10. Organizational effectiveness. Public institutions, which hold a monopoly on the service provided yet depend heavily on general public support, present a different milieu for effectiveness ratings than most other organizations. Monitoring systems must gather feedback from the clients of such institutions.

11. Information systems. Due to the need for quick turn around on

large volumes of data, program monitoring must have computer based information systems as an integral part.

The preceding position statements, regarding the various evaluative concepts and strategies that have been identified from the literature, provide the framework within which the following model is presented.

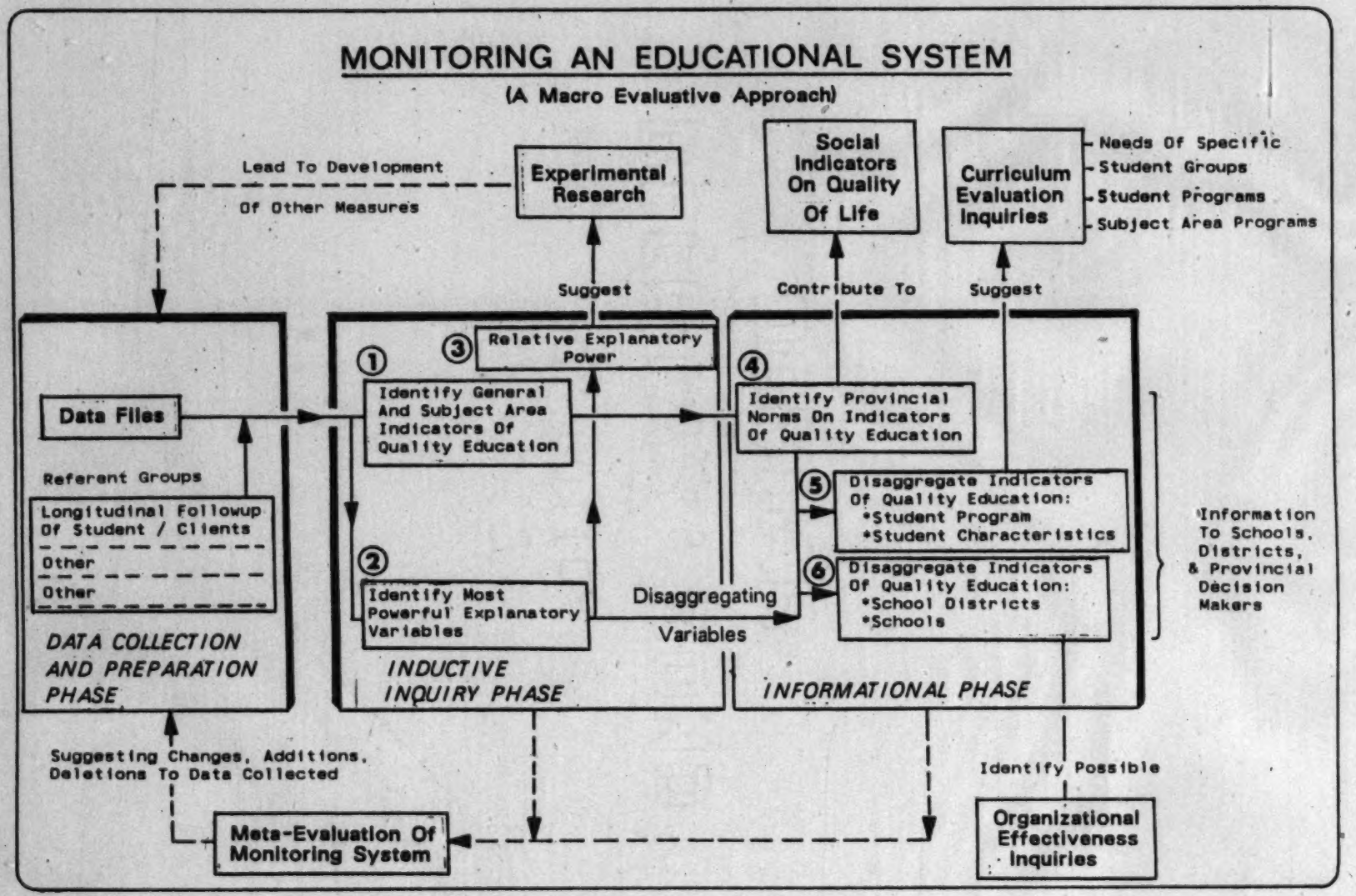
A Model for Monitoring an Educational System at the Macro Level

Educational programs in Canada are constitutionally a provincial responsibility. As a result, the provision of free public education (K-12) has been a joint venture involving both local school boards and the Department of Education in each Canadian province. Politicians and administrators at either of these two institutional levels would be the users of evaluations at the proposed macro level.

Since decision makers at the macro level have to deal with the allocation of finite public funds to the growing demands of social programs, they require comparative information concerning the current status of the quality of each social program. Comparisons have to be made with alternative educational programs as well as with other competing social programs. Questions often posed include: (a) what is the quality of education in a utilitarian sense? or, (b) how much is being received for the expenditures made?

A model designed for use in monitoring an educational system, its sub-systems and on-going programs, was developed for the present study. In developing the model, use was made of the criteria identified earlier for monitoring at the macro level. The model served as the framework for the present study and appears in Figure 2.

Figure 2


MONITORING AN EDUCATIONAL SYSTEM
(A Macro Evaluative Approach)
Lead To Development
Of Other Measures
Experimental Research
Social Indicators On Quality Of Life
Curriculum Evaluation Inquiries
Needs Of Specific
Student Groups
Student Programs
Subject Area Programs
Suggest
Contribute To
Suggest
Relative Explanatory Power
1
Identify General And Subject Area Indicators Of Quality Education
3
4
Identify Provincial Norms On Indicators Of Quality Education
Data Files
Referent Groups
Longitudinal Followup Of Student / Clients
Other
Other
5
Disaggregate Indicators Of Quality Education:
*Student Program
*Student Characteristics
2
Identify Most Powerful Explanatory Variables
Disaggregating Variables
6
Disaggregate Indicators Of Quality Education:
*School Districts
*Schools
Information To Schools, Districts, & Provincial Decision Makers
DATA COLLECTION AND PREPARATION PHASE
INDUCTIVE INQUIRY PHASE
INFORMATIONAL PHASE
Suggesting Changes, Additions, Deletions To Data Collected
Identify Possible
Meta-Evaluation Of Monitoring System
Organizational Effectiveness Inquiries

Three major phases are identified in the model: the data collection phase, the inductive inquiry phase and the information phase. In addition, three stages are identified in each of the last two phases. The research sub-problems of the thesis parallel these six stages.

Data Collection and Preparation Phase

Data collection and preparation is an important first step in the model. The types of data which should be collected are described in earlier sections of this chapter. The proposed emphasis is on data directly related to the student-client of the school. Due to the long range impact of schooling, follow-up data must be an integral part of a monitoring system, along with readily available data from existing files.

While not included in the present research, information gathered from other referent groups such as parents and teachers is also important. Qualitative information of the ethnographic type could also be collected. However, as the goal of monitoring is summary type information, detailed qualitative information would not normally be included.

Inductive Inquiry Phase

This phase focuses on the analysis of the data collected for the purposes of identifying inherent meaning. The three stages of the inductive inquiry phase are:

a. identify outcome indicators of educational quality,

b. identify antecedent and transactional variables (both student-based and school-based) which account for the variance in the quality indicators, and

c. determine the relative explanatory power of the variables

identified in the second stage.

The results of these three stages are the identification of indicators of quality education and the identification of possible contributory variables. The purpose for identifying these possible contributory variables is to permit the disaggregation of the quality indicators in order to examine in more detail the distribution of quality within the educational system. Hence the main products of this phase are quality indicators and variables to be used for the purpose of disaggregating the quality indicators.

This phase was developed in recognition of the crude nature of macro evaluation, due to the influences of contaminating variables and the level of development of appropriate methodologies. The inductive inquiry phase seeks to assure the re-examination of the quality indicators selected as disaggregating variables in each cycle of monitoring.

Information Phase

After the identification of the quality indicators and the selection of antecedent and transactional variables as disaggregative variables, the presentation of the data in an informative and evaluative manner is desirable and becomes the focus of the third and last phase of the model.

The first stage involves the development of provincial norms as a type of operationally based standard, for each of the quality indicators. In the second stage, the focus is on examining the distribution of "quality" among different groups of student-clients. In the third stage, the data are examined from the perspective of different institutional units within the school system.

Complementary Evaluations

The model displays the relationship of the monitoring process with other complementary evaluations.

The inductive inquiry phase has the potential for raising questions requiring experimental research as a followup, as certain antecedents or transactions are identified as being associated with a higher quality of education. More detailed research may be initiated through analysis of the particular quality indicators identified with a view toward development of alternate sources of data.

The first stage of the information phase would contribute provincial educational indicators for potential inclusion within the broader area of social indicators of the quality of life. More in-depth curriculum evaluations may be suggested as a result of the level of quality indicated within each of the subject areas of the school program generally.

The second stage has the potential for identifying differences in the quality of education received by certain sub-groups of students. Such information has the potential for identifying the need for curriculum evaluation studies to determine causes of and possible remedies to inequitable situations.

The third stage of the information phase, when carried out on a province-wide basis year by year, could identify organizational units which should possibly be candidates for more in-depth organizational effectiveness evaluation.

Summary

This chapter has briefly outlined a research perspective which emphasizes on-going interaction with the data, a view which recognizes the need for hypotheses and new directions to grow out of the data.

A variety of concepts within evaluation generally which help to identify a particular conceptualization of what evaluation is and should be, have been reviewed. Examples of literature from different disciplines which are concerned with evaluation and whose activities often meet and interface at the macro level of evaluation have been reviewed. The approaches that have been identified have had a major influence in the development of this thesis.

The final section of this chapter has provided a description of the evaluative perspective adopted for this study along with an outline of a model for monitoring an educational system. The model presented has guided this research and provided the structure for this thesis.

CHAPTER 3

REVIEW OF THE CURRICULUM EVALUATION PROJECT

The Curriculum Evaluation Project (Collett, 1978) was commissioned by Alberta Education in 1970 to start the development of a broad, synoptic approach to the evaluation of schooling in terms of province-wide goals, objectives, programs, priorities and issues. It was a pilot test of what could become an on-going systematic approach to gathering and organizing evaluative information about the high school curriculum from a provincial perspective. The CEP was undertaken primarily as a result of expressed concerns over the apparent higher cost of providing vocational programs compared with other more traditional programs in the high school.

While the intent of CEP was to collect information from all sources, the pilot test of the approach focused on information associated with and provided by the student-client.

Department of Education records (student records and school A-Cards) were the source of province-wide educational information about these students. Student questionnaires provided individual self-report information and evaluative feedback on goals, subject area objectives, school services and learning activities. The project was longitudinal in design, with three student questionnaires being completed: (a) the first, during the grade 11 year (1971), (b) the second, one year after the grade 12 year (1973), and (c) the third, five years after the grade 12 year (1977).

The population selected was the entire grade 11 student body enrolled in the 1970-71 school term in the province of Alberta. Since background information would be required on each student, all students for whom there was not a complete grade 9 and 10 record were deleted. A random sample of the remaining 30,000 plus students was drawn, giving a sample size of 2754.

For the sample identified, 2224 of the first questionnaires or 80% were returned.

The second questionnaire was, through error, mailed only to the 2224 persons who had responded to the first questionnaire. Of these, 1340 questionnaires were returned for a 49% return (60% of those mailed).

The third questionnaire was mailed to the entire sample of 2754, of which 740 (27%) were returned.

Broader scope. As the Curriculum Evaluation Project developed, the need for an on-going systematic approach to gathering and organizing "macro-evaluative" information became more apparent. Hence a broader, though implicit, purpose of CEP became the demonstration of ways in which such an on-going approach might function. Data collected and methods used often went beyond the initial purpose in order to meet this additional objective.

Data gathered focused on goals and goal statements, student programs actually experienced, subject area objectives, school services and generalized learning activities. The student-clients involved were asked to evaluate "how adequately did your high school program meet these aims for you?" Accompanying educational and occupational achievements were also recorded. Evaluative information

regarding what was their experience was supplemented on the third questionnaire by soliciting their views regarding what should be in the future.

More specifically, the CEP data bank contained the following types of provincial information:

a. antecedent information about the student prior to enrollment in the high school,
b. the results of student-client feedback on the process of course and program selection,
c. the results of computer analysis of student records identifying course patterns or "programs" experienced by students,
d. self-report information regarding career plans and (through the followup questionnaires), career achievements, both educationally and occupationally,
e. student-client evaluation of the school's achievement of general goal statements and subject area objectives, and
f. student-client ratings of the importance of general goal statements and subject area objectives.

Sources and type of information were as presented in Table 1, while a complete listing of the variables within the data bank is provided in Appendix A. A copy of the segments of the followup questionnaire which are relevant to this present study is provided in Appendix B.

The CEP report did not make available district or school level categorizations of information gathered. Hence, the report presented findings for the province as a whole rather than laying the basis for

TABLE 1

SOURCES AND TYPE OF INFORMATION

(a) Departmental Student Records	
- observed antecedents:	junior high ability and achievement scores, student age, sex;
- observed transactions:	student programs;
- observed outcomes:	educational achievement, grades etc.
(b) Departmental School Records	
- observed antecedents:	credits offered by school, enrollments, type of school, type of terms, region, number of teachers.
(c) First Student Questionnaire (Q1)-1971	
- observed antecedents:	father's education, mother's education, educational and occupational plans;
- observed transactions:	teaching methods.
(d) Second Student Questionnaire (Q2)-1973	
- observed transactions:	teaching methods;
- observed outcomes:	educational and occupational achievements.
(e) Third Student Questionnaire (Q3)-1977	
- observed outcomes:	educational and occupational achievements, goal and objective achievement ratings;
- intended outcomes:	importance ratings on goals and objectives.

an on-going program of monitoring at the district or school levels.

Data Preparation Methods Used by CEP

The prepararion that was undertaken for many of the variables are evident from the descriptions of the variables themselves. A few of the variables in the data bank were derived from rather complex analysis of student records. Two of these derived variables require some special explanation. These two were:

Categorization of high school achievement. Five levels of high school achievement were identified as: matriculation, high school diploma, grade 11 entrance to technical programs, completed grade 10, and an incompleted grade 10. Criteria for each of these levels were then identified and listed. A computer program was written to analyze the high school record of each student and assign an ordinal number from 1 to 5 to each student file. For certain analyses this variable was treated as having an ordinal scale.

Student program. This variable identified the type of student program in terms of the group of courses taken by the student. Categories were determined in two ways. The first categorization included the traditional matriculation, business, vocational and general groupings. An analysis of student records by clustering techniques, supplemented by subjective judgement, resulted in a further breakdown of these groupings into 15 categories. It was then necessary to establish mutually exclusive yet exhaustive criteria for each of these categories and to write a computer program to analyze the student records and assign category designations to each file. Grade 11 registrations were used for this purpose. The detailed

description of the criteria for each category is available in the Curriculum Evaluation Project report (Collett, 1978).

Summary

The data bank established for the Curriculum Evaluation Project provided the data for the present study. This was a longitudinal study of the grade 11 class of 1970-71. The present study selected some of the variables used by CEP, but utilized additional data that were in the data bank but not used by CEP. Variables that were selected are described in the next chapter.

CHAPTER 4

METHODOLOGY

This chapter outlines the various methodologies used in undertaking the research. The conceptual framework outlined in the preceding chapter identified three phases in the monitoring of on-going school programs. The first phase of the monitoring process outlined in Chapter 2 (Data Collection and Preparation) was, in part, completed before the present study was undertaken, as the CEP data bank (referred to earlier in Chapter 3) provided the variables adopted for this study. It must be noted however, that the report of the CEP did not include an analysis of all of the data that had been collected at that time. A review of the methodologies associated with the data collection and preparation phase is provided in Chapter 3.

Phase one: data selection and preparation. While the complete application of the model presented earlier would include the collection of data, this present study required only the selection of data from the CEP data bank and appropriate preparation of the data in the development of required variables. The criteria used for the selection of appropriate variables and the methods used in the development of additional variables from the raw statistics within the data bank are outlined in the first section of this chapter. The report of this activity provides the listing of the variables utilized in the present study.

Phase two: inductive inquiry. The inductive inquiry phase of the present study encompasses the first three of the six research

sub-problems posed in Chapter 1. These are:

1. to identify general and subject area indicators of quality education;
2. to identify student-based and school-based variables which account for significant variance in the indicators of quality education;
3. to determine, for selected indicators of quality education, the total variance which is accounted for by the student-based and school-based variables and the explanatory power of each of these variables.

Phase three: informational. The third phase of the monitoring process proposed is the information phase and includes, in the present study, the following sub-problems:

4. to compute provincial norms for each indicator of quality education;
5. to identify, for selected indicators of quality education, differences among groups of students classified on the basis of student programs and student characteristics;
6. to develop profiles for selected schools and districts using the various indicators of quality education.

Data Selection and Preparation Phase

This section deals with the methodologies used in the data preparation of the variables selected. Methods followed by the Curriculum Evaluation Project have been reviewed in Chapter 3. Additional new variables were prepared from the data bank specifically for the present study. The methods associated with this additional

data preparation are outlined in this section.

Variables Selected from the CEP Data Bank

As a first step, variables used by CEP were examined and those meeting the requirements of the conceptual framework were selected. Many of the items within CEP were either of a survey nature or dealt with the establishment of importance ratings of goals and objectives and therefore not considered appropriate for the on-going monitoring function addressed herein.

Secondly, an examination of the complete data bank that had been assembled for CEP yielded much additional data which were relevant to the monitoring function. The variables pertaining to subject areas were especially important.

Table 2 presents in brief form the variables selected for use in the thesis, showing their type, description, and source. Variables are also identified as to whether they were used in the CEP report, calculated so as to summarize CEP data, or taken from the original data bank. A detailed listing of the selected variables is presented in Appendix C.

While many of the variables selected came directly from either Alberta Education files or the student questionnaires, others were the results of preparatory analyses which are referred to briefly in the following paragraphs.

Methods Used in Preparation of Additional Variables

The detail of the methodology used in the preparation of variables through the calculation of means, or the tallying of various

TABLE 2

VARIABLES SELECTED FOR USE FROM THE CEP STUDY

Variable Category	Description of variables	Source
Outcomes		
a) General		
1) internal	high school average, categorization of high school achievement, high school credits	Department of Education student records
2) external	years of further education, career status[1], occupational rank (Pineo-Porter), wage bracket, level of career satisfaction, rating of 34 sub-goals, rating of 12 goals	student followup
b) Subject area		
1) internal	credits achieved[2], average grade[2], distribution of grades[2]	Department of Education student records
2) external	mean rating of subject area objectives[1]	student followup
Transactions		
a) student based	categorization of student programs	Department of Education student records
b) school-based	credits offered, enrollment, number of teachers, pupil-teacher ratio, number of counsellors, academic/business/composite, type of term	school A-Cards
Antecedents		
a) student based	year of birth, sex, ability scores, grade nine achievement, self-ability rating, parents' socio-economic status, parents' education, career decision, career plans	Department of Education student records, student questionnaire
b) school-based	school region, urban-rural, school code, school district[3]	school A-Cards

[1]variables computed from CEP variables
[2]variables computed from original data bank
[3]additional variable from Department of Education records

entries in the data bank is not elaborated here. It is hoped that these methods are apparent as a result of the labelling of the variables. Further explanation is required in the case of four of the variables.

Student program. The CEP had categorized the student programs two different ways, one into four categories, and the other into 15 categories. It was felt however that categories more discriminating than four but more parsimonious than 15 could be developed. As a result the 15 categories were collapsed into nine and a new variable developed to provide this designation. Analysis in the Inquiry Phase showed which of these groupings would be the most appropriate.

School district code. The student records contained reference only to the school attended. It was necessary therefore to establish a catalogue of school districts with their respective schools. A computer program was then developed to assign the appropriate district code to each student's record based on the school code.

Career status. The follow-up questionnaire was in two parts, dealing with occupational status and type of employment. For the purposes of the present study, these two variables were collapsed into one.

Achievement of goals. The CEP followup questionnaire gathered ratings on 34 sub-goals as listed in the Department of Education Program of Studies (1977). In the interests of parsimony, these sub-goals were grouped under their original goal headings and mean achievement ratings were calculated for each of the 12 major goals of education.

Inductive Inquiry Phase

The inductive inquiry phase, undertaken during each cycle of the monitoring activity, examines the variables used in order to provide the evaluator with information helpful in designing possible follow-up research and with information on ways of improving or extending the collection of data during the subsequent cycle. The objective is the continual testing and upgrading of the variables used in the monitoring system. This phase encompasses the first three sub-problems of the study.

Implied in the theoretical model developed in Chapter 2 is that each of these steps would be required each time a monitoring study was undertaken. The purpose of repeating this phase each time would be to confirm or call into question the results of prior monitoring and to introduce new variables as they are developed and added to the system.

The following are descriptions of the methods and procedures used in addressing the three sub-problems associated with this phase.

Identification of Quality Indicators

> Sub-problem 1: to identify general and subject area indicators of quality education.

Views differ as to whether quality indicators should include only measures of outcomes or whether measures of certain "process" or transactional variables should also be included. According to the latter view, such transactional variables would be included as quality indicators, where they were known to be either desirable educational events or could be shown to be associated with desired outcomes.

The position adopted for this study was to consider outcomes

alone as indicators of quality. A list of criteria for such quality indicators, was presented in Chapter 3.

Procedures. The steps used in identifying the quality indicators to be incorporated into the monitoring system were as follows:

1. Variables were selected from the data bank which, according to earlier identified criteria, were considered to be outcome measures. Average ratings were developed for the provincial goals by computing means for the respondent ratings of the relevant sub-goals.
2. Parsimony of outcome variables was sought by a procedure which combined highly intercorrelated variables or dropped one variable from pairs of highly intercorrelated variables. Specifically, this procedure involved intercorrelating all the outcome variables selected and then examining critically the correlation coefficients. Where high correlations existed one of the two related variables was dropped if theoretical overlap was apparent. However, if the two variables were thought to be conceptually discrete, a combination of the two variables into one was undertaken.

Identification of Disaggregative Variables

> Sub-problem 2: to identify student-based and school-based variables which account for significant variance in the indicators of quality education.

In identifying independent variables most explanatory of variance in the quality indicators, important antecedent or transactional variables were identified for further examination in the information phase of program monitoring. If a significant amount of the variance

for a given quality indicator was found to be accounted for by an antecedent variable, such as the sex of the respondent, it is important that the nature of the relationship between the indicator and the particular variable be shown. For example, whether males or females had higher scores on a given quality indicator might reveal that one or the other of these two had been the recipients of a higher quality education as measured by the indicator involved. Such an antecedent variable would then be used to disaggregate the quality indicator in order to show the nature of this relationship.

The assumptions of the statistical procedures used require that such predictor variables be mutually exclusive and non-interactive.

Procedure. The procedure followed for identifying variables accounting for variance in the quality indicators was a combination of an interative clustering algorithm and one-way analysis of variance. This procedure (SEARCH) was developed by Sonquist (1973) and is available as a computer program within the OSIRIS IV Statistical Analysis and Data Management System (1979). For each dependent variable, SEARCH sequentially divides the sample on the independent variable with the highest explanatory power (ANOVA), subsequently resulting in clusters of the sample with specified characteristics based on the splits made on the various independent variables. A one-way analysis of variance is computed for the final groups in order to show the amount of variance accounted for by the resulting model. Examination of the path of the various splits can identify interactive terms thus permitting the formulation of combined terms which contain the interactive elements.

SEARCH runs. One SEARCH run was made for each quality indicator, using each as a dependent variable. The results were then examined for interactions and the independent variables most frequently chosen for clustering were selected as potential disaggregate variables. These potential disaggregators were further validated by the multiple regression approach used in sub-problem 3.

Relative Explanatory Power

> Sub-problem 3: to determine, for selected indicators of quality education, the total variance which is accounted for by the student-based and school-based variables and the explanatory power of each of these variables.

The determination of the explanatory power of the independent variables was undertaken primarily to show:

a. the possible extent to which appropriate variables have been identified for disaggregation of the quality indicators,

b. the comparative explanatory power from one quality indicator to the next, and

c. the more influential (marginal) dependent variables for each quality indicator.

The findings of a, b, and c above, help to validate the disaggregate variables, show the importance of various antecedent and transactional variables, and identify potential research projects.

The methodology considered most appropriate for the third sub-problem was multiple linear regression. The major assumptions underlying multiple linear regression analysis could be met, since the initial analysis undertaken using the SEARCH methodology had reduced the number of variables and identified interactions. Since much of the data was of a nominal nature, a specially adapted regression

analysis developed by Baker et al (1972) was used. This adapted analysis, labeled Multiple Classification Analysis (MCA), uses a dummy variable approach in order to accommodate the nominal variables.

The task therefore was to run an MCA analysis for each quality indicator using the independent variables identified in sub-problem 2. From these analyses regression equations were formulated. Multiple correlation coefficients were also calculated in order to show the degree of association in each case.

Information Phase

The third phase of the monitoring scheme and the second major part of the present research took the basic variables dealt with in phase two and presented them in three different ways:

a. provincial norms on the quality indicators,
b. a disaggregation of the indicators based on student programs and student characteristics, and
c. a disaggregation of the indicators based on school characteristics.

The following are the outlines of the methodologies used for each of these sub-problems.

Provincial Norms

Sub-problem 4: to compute provincial norms for each indicator of quality education.

Provincial norms for each of the quality indicators provide aggregate information concerning levels of achievement for all of the outcome areas represented.

The methodology used in determining these provincial norms was a combination of means and standard deviations along with categorical breakdowns where appropriate. Means were used for quality indicators based on variables which used interval scales, categorical breakdowns were used for quality indicators based on variables which used nominal scales.

For selected goal indicators based on items which had five category Likert-type interval scales, percentages of the sample in various categories were computed and the top two response categories collapsed for simplicity in data handling.

Student Characteristics Disaggregation

> Sub-problem 5: to identify, for selected indicators of quality education, differences among groups of students classified on the basis of student programs and student characteristics.

Disaggregations of the quality indicators based on student characteristics was undertaken to show the distribution of the general quality of education among certain student groups or, in other words, to show the variation in achievement toward the quality indicators by various student groups.

The variables selected as disaggregators had earlier shown informative potential in that they were associated with certain levels of variance in the quality indicators.

Student-based predictor variables fell into two major categories, namely antecedent and transactional. Antecedent variables focused on background characteristics of an educational, social or individual nature. These variables included age, sex, ability, previous scholastic achievement, self ability ratings, socio-economic status

and career plans. Only one student-based transactional variable was included. This variable identified the cluster of courses which comprised the "program" that the student followed while in school.

The procedure. Computer-based two dimensional cross tabulation was used to identify differences among groups classified on the basis of the various personal and school program variables. Since the student program variable was identified most often as the variable associated with the greatest amount of variance in the educational quality indicators, a three-dimensional cross tabulation was undertaken with categories of selected indicators, selected student characteristics, and the various student programs.

Percentage distributions were selected as the most appropriate way of showing the varying loci of achievements on the quality indicators by students of varying backgrounds and following various high school programs.

Institutional Disaggregation

> Sub-problem 6: to develop profiles for selected schools and districts using the various indicators of quality education.

Institution-based variables were also considered important within the monitoring system. Those institution-based variables which were descriptive of various types of schools or various school characteristics were used, as well as identifying variables of specific schools and specific school districts.

Type or characteristic variables represent features of the school or school program which resulted from certain policy decisions. The school and school district disaggregate variables are important as

they identify the different administrative or decision making units within the province.

Cross tabulation procedures were again used in developing institutional profiles of achievement on selected outcome quality indicators. As the number of schools and districts were large and the purpose of this part of the study was illustrative only, a small number of representative schools and districts were selected for example. Schools and districts were selected representative of urban and rural origins as well as of the different regions of the province.

Summary

The methodologies used within the framework of the proposed model for monitoring school programs have been presented in this chapter.

In dealing with sub-problem 1, the identification of quality indicators, methods used included intuitive examination of underlying concepts, correlations, and various statistical processes for combining variables. Sub-problem 2 required the use of the computer-based SEARCH process, followed by analysis of variance, in the identification of both antecedent and transactional variables which were most associated with variance in the quality indicators. Multiple classification analysis, a specialized analytical program similar to step-wise multiple regression, provided the ability to deal with sub-problem 3, which was the determination of the extent to which variance was accounted for by the model and the relative explanatory power of the most significant independent variables.

Sub-problem 4, the calculation of provincial norms on the quality indicators, required the simple calculation of means where

appropriate, and in other cases the determination of categorical percentages. Disaggregation based on student characteristics and institutional levels (sub-problems 5 and 6) required the application of statistical breakdown procedures and cross tabulations along with appropiate filter systems.

All of the statistical procedures used were provided by the OSIRIS IV Statistical Analysis and Data Management System developed at the Institute for Social Research at the Universtiy of Michigan.

The results of the study described herein are presented in the next 2 chapters.

CHAPTER 5

RESULTS: INDUCTIVE INQUIRY PHASE

This chapter presents the findings for the first three sub-problems which form the inductive inquiry phase of the study. The results for the remaining sub-problems (the information phase) are contained in Chapter 6. The first sub-problem dealt with the identification of indicators of quality education. The second sub-problem dealt with the identification of student-based and school-based variables accounting for significant variance in the indicators of quality education. Sub-problem 3 sought to compute the total variance accounted for by all, and the explanatory power of each, of the student-based and school-based variables, in association with selected indicators of quality education.

Quality Indicators

Sub-problem 1: to identify general and subject area indicators of quality education.

Only variables which were classified as "outcomes" were considered for use as potential indicators of quality education. Two categories of outcome variables existed. The first category was broader in scope than the second and focused on general educational outcomes. The second category focused on outcomes specific to subject areas. The primary objective at this stage was to seek parsimony of indicators by minimizing overlap, yet assuring reference to a cross section of goal areas and theoretical constructs.

General Quality Indicators

Measures of educational outcomes gathered while students were still in school, along with measures of career achievements and later evaluations of educational goals by the former students were selected from the data bank for further analysis. Using these outcome measures, answers to three questions were sought:

1. What was the extent of overlap identifiable conceptually as well as statistically?
2. Which measures could be combined in order to reach the objective of parsimony?
3. What numerical representations for each outcome measure would clearly enable comparative evaluations?

The outcome measures taken from the data bank along with the resultant quality indicators are presented in Table 3. The results for each research question follow and deal in turn with internal measures, career achievements, and goal ratings.

Internal measures. Intercorrelations in the range of .63 to .86 were recorded among the three outcome measures: (1) the level of high school achievement, (2) the average mark over all courses, and (3) the total number of high school credits achieved. The highest correlation was found to exist between the variables "high school achievement" and "total credits". One of the numerous criteria of "high school achievement" was the number credits earned, thus contributing to this high correlation. Since the "total credits" variable did not include diploma criteria nor entrance requirements to post-secondary programs and, given the high correlation with high school achievement, it was

TABLE 3

GENERAL OUTCOME MEASURES AND THE DERIVED GENERAL QUALITY INDICATORS

General Outcome Measures Extracted From The Data Bank	General Quality Indicators Derived
Internal - Achievements within school:	
1. Level of high school achievement, i.e. matriculation, high school diploma, or technical institute entrance	#1- Percent achieving high school diploma #2- Percent achieving matriculation
2. Average mark over all courses	#3- Average of high school marks
3. Total number of high school credits achieved	
External - Career achievements as reported five years after school:	
4. Years of further education	#4- Average years of further education
5. Employment status	#5- Percent unemployed and seeking a job
6. Occupational category	#6- Average Pineo-Porter job status level
7. Pineo-Porter ranking of occupation	#7- Percent earning over $12,000
8. Wage bracket	#8- Percent Satisfied/very satisfied with career
9. Degree of career satisfaction	
External - Ratings of the 12 Goals of Education (five years after school):	
10. Develop basic skills and special knowledge competencies: a. Develop understanding and skills in the use of numbers, natural sciences, mathematical and social sciences b. Develop a fund of information and concepts c. Develop special interests and abilities	#9- Percent Adequate/very adequate: "Basic Competencies"
11. Learn how to organize, analyze, and use information in a critical and objective manner: a. Develop skills of thinking and proceeding logically b. Develop ability to organize information into meaningful categories c. Develop ability to apply scientific methods in the pursuit of and analysis of knowledge	#10- Percent Adequate/very adequate: "Use Information"
12. Develop skills in communication: a. Develop skill in oral and written languages b. Develop skill in understanding the communication of others c. Develop ability in communicating ideas and feelings effectively	#11- Percent Adequate/very adequate: "Communication Skills"
13. Practice and understand the ideas of health, fitness and safety: a. Establish sound personal health habits b. Develop an understanding of good physical and mental health practices c. Establish a good physical fitness program	#12- Percent Adequate/very adequate: "Health, Fitness, Safety"

Contined on next page

TABLE 3 (continued)

14. Learn to respect and to get along with people of varying beliefs and life styles:	
a. Develop appreciation and respect for the worth and dignity of individuals	#13- Percent Adequate/very adequate: "Respect Others"
b. Learn to take into account the values of others when making personal choices	
c. Develop an understanding of functions, responsibilities and achievements of various societal institutions	
15. Develop a desire for learning:	
a. Develop a positive attitude toward learning	#14- Percent Adequate/very adequate: "Desire Learning"
b. Develop intellectual curiosity and eagerness for lifelong learning	
16. Learn about and try to understand the changes that take place in the world:	
a. Develop understanding of the past, identify with the present and the ability to meet the future	#15- Percent Adequate/very adequate: "Understand Changes"
b. Develop an awareness of and the ability to adjust to a changing social and physical environment	
c. Develop ability to adjust to the changing demands of Canadian society	
17. Learn to be a good citizen:	
a. Develop an attitude of respect for public and private property	
b. Develop an understanding of the Canadian and other forms of government	#16- Percent Adequate/very adequate: "Good Citizenship"
c. Develop an awareness of civic rights and responsibilities	
d. Develop an understanding of the obligation and responsibilities of Canadian and world citizenship	
e. Develop a feeling of cultural identity and heritage at national and international levels	
18. Learn how to use leisure time:	
a. Develop a positive attitude toward participation in a range of leisure time activities - physical, intellectual and creative	#17- Percent Adequate/very adequate: "Leisure Time"
b. Develop interests which will lead to a wise and satisfying use of leisure time	
19. Appreciate culture and beauty in the world:	
a. Cultivate appreciation for beauty in various forms	
b. Develop creative self-expression through various media including the fine and practical arts	#18- Percent Adequate/very adequate: "Appreciate Culture"
20. Develop management skills:	
a. Develop an understanding of economic principles and responsibilities	#19- Percent Adequate/very adequate: "Management Skills"
b. Develop skills in managing natural, financial and human resources	
21. Learn about the world of work after high school:	
a. Develop skills basic to the world of work after high school	
b. Develop the ability to use information and counselling services related to career decisions	#20- Percent Adequate/very adequate: "World of Work"

dropped as an indicator. No combination of measures was considered in this category.

The mean of the high school achievement variable could have been used as a quality indicator. However, the decision was made to focus attention on the percentage of students that had achieved a high school diploma. In order to accomplish this, the percentage of students in the top two categories of this variable were selected as a general indicator of quality education.

The average of all high school marks was retained as a general indicator of quality education because of the lower intercorrelation of this variable.

Career achievements. Six different career achievement variables were considered as shown in Table 3. Intercorrelations among these measures were quite low, in the range of .16 to .42, with the exception of employment status and the Pineo-Porter ranking of occupations for which the correlation coefficient was .71. The low correlations were considered indicative of little overlap and therefore supported the inclusion of each variable as separate measures of career achievement outcomes of the educational experience. The relatively high correlation in the case of the one pair of variables ($r=.71$) suggested that both were assessing similar outcomes. Comparison of the two items revealed that this indeed was the case, with one being a categorization of job type and the other, the Pineo-Porter ranking, being a combination of job type, prestige ratings and salary. However, one category of the employment status variable, unemployment, was not covered by the Pineo-Porter scale. The result was the identification of the five quality indicators as

shown in the table. In the case of the general quality indicators 5 and 7 (column 2 of Table 3), the mean was considered appropriate in that the units of measure were years. Indicators 6, 8 and 9 were more categorical and therefore percentages were chosen as the unit of measure.

Goal ratings. The 34 goal statements ranked by the respondents who participated in the C.E.P. followup study (listed under each of the 12 respective goals in Table 3) had been administered in two sets of 17 goal statements, with each set ranked by half of the respondents. As a result, correlations and factor analysis could only be done for each set of 17 statements separately.

Correlations and factor analyses for the two sets of goal statements did however show some statistical justification for combining the rankings of the goal statements. This finding, plus the fact that the goal statements were identified by the Department of Education as expansions on its 12 goals of education, were considered justification for combining the ratings of the 34 goal statements under each of the 12 goals of education.

The original 34 goal statements are presented in Table 3 grouped under the 12 major goals numbered 10 through 21 inclusive. After combining the goal ratings to form 12 variables, intercorrelations among these variables were computed and the resulting correlation coefficients were still small, ranging from 0 to .35. Four response categories had been provided for each statement, "very adequate," "adequate," "not adequate," and "don't know." For the purposes of developing a comparative indicator of quality, the two categories entitled "adequate" and "very adequate" were combined. The quality

indicator derived therefore was the percentage of respondents judging the corresponding goals to be either adequately or very adequately achieved within the high school program in which they were enrolled.

Subject Area Quality Indicators

Outcome measures specific to each subject area were considered important as indicators of strengths and weaknesses in the school offerings. Such indicators could help to identify curricular areas that may be in need of more detailed evaluation. Measures contained in the data bank and selected for further analysis included the number of credits attained in each subject area, the marks achieved in each subject area, and respondent ratings of the extent to which the subject area objectives were met for them. The outcome measures selected along with the derived subject area quality indicators are presented in Table 4. The same questions used in identifying the general quality indicators were again posed in identifying subject area indicators of quality. The statistical analyses undertaken identified a number of internal and a number of external indicators.

Internal indicators. Conceptually, the number of credits achieved was a measure of the extent to which students participated in course offerings within each subject area, while the average marks attained were a measure of the level of their achievement in the subject area. Pearson product-moment correlations between these two measures yielded low coefficients for most subject areas, supporting the concept that each of these was measuring a different outcome area. For the general academic, fine arts, physical education, business

TABLE 4 .

SUBJECT AREA OUTCOME MEASURES AND THE DERIVED SUBJECT AREA QUALITY INDICATORS

Subject Area Outcome Measures Extracted From Data Bank	Subject Area Quality Indicators Derived
Internal - Subject area achievements within school:	Extent of student participation in each subject area.
1. Total number of credits taken in: a. Matriculation English Courses, b. General English Courses, c. Social Studies Courses, d. Social Science Courses, e. Matriculation Mathematics Courses, f. General Mathematics Courses, g. Matriculation Science Courses, h. General Science Courses, i. Second Languages Courses, j. Art Courses, k. Drama Courses, l. Music Courses, m. Physical Education Courses, n. Business Education Courses, o. Home Economics Courses, p. Industrial Arts Courses, q. Vocational Education Courses	#1-#17 - Average credits per student in subject areas: Matriculation English, General English, Social Studies, Social Science, Matriculation Mathematics, General Mathematics, Second Languages, Art, Drama, Music, Physical Education, Business Education, Home Economics, Industrial Arts, Vocational Education #18-#34 - Percentage of students taking one or more (1+) courses in subject areas: Matriculation English, General English, Social Studies, Social Science, Matriculation Mathematics, General Mathematics, Second Languages, Art, Drama, Music, Physical Education, Business Education, Home Economics, Industrial Arts, Vocational Education #35-#51 - Average number of courses taken by those involved in subject areas: Matriculation English, General English, Social Studies, Social Science, Matriculation Mathematics, General Mathematics, Second Languages, Art, Drama, Music, Physical Education, Business Education, Home Economics, Industrial Arts, Vocational Education
2. Average mark in: a. Matriculation English Courses, b. General English Courses, c. Social Studies Courses, d. Social Science Courses, e. Matriculation Mathematics Courses, f. General Mathematics Courses, g. Matriculation Science Courses, h. General Science Courses, i. Second Languages Courses, j. Art Courses, k. Drama Courses, l. Music Courses, m. Physical Education Courses, n. Business Education Courses, o. Home Economics Courses, p. Industrial Arts Courses, q. Vocational Education Courses	Marks achieved by students in each subject area #52-#68 - Average mark achieved by those involved in subject areas: Matriculation English, General English, Social Studies, Social Science, Matriculation Mathematics, General Mathematics, Second Languages, Art, Drama, Music, Physical Education, Business Education, Home Economics, Industrial Arts, Vocational Education

Continued on next page

Table 4 (continued)

3. Total number of A,B,C,D,F grades in: a. Matriculation English Courses, b. General English Courses, c. Social Studies Courses, d. Social Science Courses, e. Matriculation Mathematics Courses, f. General Mathematics Courses, g. Matriculation Science Courses, h. General Science Courses, i. Second Languages Courses, j. Art Courses, k. Drama Courses, l. Music Courses, m. Physical Education Courses, n. Business Education Courses, o. Home Economics Courses, p. Industrial Arts Courses, q. Vocational Education Courses	Grade distribution in each subject area #69-#85 - Percentage of A and B grades by those involved in subject areas: Matriculation English, General English, Social Studies, Social Science, Matriculation Mathematics, General Mathematics, Second Languages, Art, Drama, Music, Physical Education, Business Education, Home Economics, Industrial Arts, Vocational Education #86-#102 - Percentage of D and F grades by those involved in subject areas: Matriculation English, General English, Social Studies, Social Science, Matriculation Mathematics, General Mathematics, Second Languages, Art, Drama, Music, Physical Education, Business Education, Home Economics, Industrial Arts, Vocational Education
External - (five years after leaving school) 4. Adequacy rating of curriculum objectives in: a. Language Arts (4 objectives rated), b. Social Studies (4 objectives rated), c. Social Science (4 objectives rated), d. Mathematics (4 objectives rated), e. Science (4 objectives rated), f. Second Languages (4 objectives rated), g. Art (4 objectives rated), h. Drama (4 objectives rated), i. Music (4 objectives rated), j. Physical Education (4 objectives rated), k. Business Education (4 objectives rated), l. Industrial Education (4 objectives rated)	Evaluation Of The Achievement Of Objectives Within Each Subject Area #103-#114 - Average adequacy rating in subject areas: English, Social Studies, Social Science, Mathematics, Science, Second Languages, Art, Drama, Music, Physical Education, Business Education, Industrial Education

education, home economics and industrial education courses the correlation coefficients ranged from .02 to .37. For "matriculation type" subjects coefficients were higher, in the range of .46 to .71. Nevertheless, correlation coefficients were considered low enough overall to treat these two as separate measures.

Focusing on the extent of participation, three possible indicators were selected. Indices were computed for each. First, the mean of the number of credits taken would be useful in showing how much time the average student spent in each subject area while in high school. Second, the extent of participation could be shown by computing the percentage of students who had taken one or more courses in each subject area. The third indicator selected focused only on the students who had taken at least one course. To indicate the extent of participation by this group, the average number of courses taken was computed.

Focusing on the level of achievement of students in each subject area, three further indicators were selected and indices for each computed. First, the average mark achieved by students in each subject area was adopted as one indicator. Second, in order to provide a clear indication of the distribution of marks, particularly in terms of the way that they might influence further study by students, the proportion of A and B grades combined was used as another indicator of subject area achievement. Third, since students do not achieve credits with a grade of F, and even with a grade of D cannot proceed to the next level of studies, the percentage of grades D and F combined was taken as a further indicator of achievement (or lack of) in each subject area.

External indicators. The measurements available from the data bank included a Likert scale rating of the objectives of each subject area by those who had taken at least one course. As part of the Curriculum Evaluation Project, respondents had been asked to answer only if they had taken at least one course in the specific subject area. Further checks based on the indicators referred to in the preceding paragraph showed that in three subject areas (fine arts subjects) a large number had responded who had not actually taken one or more such courses, and these were rejected. A cluster analysis was undertaken for the responses associated with the entire set of subject objectives. Relatively high intercorrelation coefficients (varying from subject area to subject area, but generally in the range of .50 to .70) for the objectives associated with each subject area resulted in clusters of relatively high correlation coefficients falling almost entirely within subject areas. These results suggested the combining of these ratings into one indicator for each subject area. This was done by using the arithmetic mean as shown in Table 4.

Intercorrelations were computed between the mean rating and each of the credits taken and the average mark, in order to determine the extent of overlap. Positive correlation coefficients in the range of .21 to .47 resulted when the number of credits was intercorrelated with the mean rating for all subjects except English, Social Studies, Social Science and General Mathematics. In these four subject areas, the size of the coefficient was very low for the relationship between the number of credits taken and the rating on the objectives. Low correlation coefficients resulted when the average marks attained were correlated to the mean rating on the objectives.

Accounting for Variance in the Indicators of Quality Education

Sub-problem 2: to identify student-based and school-based variables which account for significant variance in the indicators of quality education.

The second sub-problem was to identify from the student-based and school-based (antecedent and transactional) variables, those accounting for the greatest amount of variance in the quality indicators identified in the previous section. The variables accounting for the greatest variance would then be considered for further analysis and for use as disaggregating variables in determining the various levels of quality of education received by different groups of students.

Analysis of variance was used to identify differences in the selected indicators of quality education for the antecedent and transactional variables within the data bank. Antecedent variables included student-based data such as sex, ability, past achievement, self ability ratings, parents' education and career plans, as well as school-based data such as the school region, urban or rural designation, the school code and the school district code. Transactional variables included a variable descriptive of the cluster of courses which comprised the students' high school program as well as various descriptive statistics of the school attended such as number of credits offered, pupil-teacher ratio, number of counsellors, academic or general or business or vocational programs offered, and the type of school term.

Significant Predictor Variables

The results of the analysis of variance are presented in Table 5. The Eta-squared (proportion of variance explained) is shown for each predictor where it was larger than .01 with the level of significance set a priori at .01.

Examination of these results was undertaken to identify mutually exclusive predictor variables which would best explain variance in both general and subject area quality indicators for the purposes of further analysis. In the interest of brevity, only a few of the quality indicators were selected for detailed analysis.

Student program. Based on Eta^2, variable 54 (student program) was generally found to be significantly related to the greatest number of the dependent variables selected. For this reason, the student program variable was selected for subsequent analysis.

School transactional variables. In only a few cases, were significant Eta^2s found for the measures descriptive of school transactions, displayed in Table 5 as variables 55 and 58 through 61. Variables such as school size (v55), pupil-teacher ratio (v58), type of term (v61), and type of program (v60) were found to have either low or no association with the indicators of quality education. Of these school-based variables, the pupil-teacher ratio (v58) was selected for further analysis since it showed the highest relationship with variance in the quality indicators. Only one school-based variable (v58) was selected due to the relatively high intercorrelations among these variables.

TABLE 5

RESULTS OF ANALYSIS OF VARIANCE FOR SELECTED OUTCOME VARIABLES[1]

Outcomes (Dependent Variables)[2]	Predictors[2]																								
	v54	v55	v58	v59	v60	v61	v63	v64	v65	v66	v67	v68	v69	v70	v71	v72	v73	v74	v75	v76	v78	v79	v80	v81	v82
General outcomes																									
Achievement level	.48	-	.01	.02	-	-	.01	.14	.16	.19	.13	.19	.20	.25	.26	.25	.31	.13	.04	.03	.19	-	-	.06	-
Average high school mark	.35	-	-	.01	-	-	.06	.20	.25	.28	.17	.25	.32	.31	.37	.31	.42	.23	.02	.03	.11	-	-	.02	-
Further education	.21	-	-	-	-	-	.05	.15	.13	.18	.09	.13	.11	.20	.16	.23	.22	.11	.07	.06	.27	-	-	-	-
Pineo-Porter ranking	.10	-	-	-	-	-	.06	.06	.04	.06	.07	.06	.10	.10	.06	.07	.11	.06	-	-	.06	-	-	-	-
Career satisfaction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subject area outcomes																									
Rating of English Objectives	-	-	-	-	-	-	.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.02	-	-	-
Credits in Matric English	.57	.02	-	.01	-	-	.01	.29	.24	.35	.25	.32	.32	.37	.33	.34	.47	.13	.06	.05	.29	-	-	.08	-
Marks in Matric English	.31	-	-	.02	-	-	.07	.26	.15	.26	.20	.31	.34	.30	.25	.24	.40	.18	.02	.03	.10	-	-	.04	-
Rating of Social Objectives	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.08	-
Credits in Social Studies	.53	.03	.02	.02	-	-	-	.21	.16	.24	.17	.22	.22	.29	.22	.24	.33	.08	.05	.05	.27	-	-	.10	.01
Marks in Social Studies	.30	-	-	-	-	-	.02	.25	.21	.29	.21	.28	.28	.37	.26	31	.41	.22	.03	.03	.14	-	-	.04	-
Rating of Science Objectives	.03	-	-	-	-	-	-	.02	.03	.03	.01	.01	-	.04	-	.04	.03	-	-	-	-	-	-	-	-
Credits in General Science	.34	.01	.01	.01	-	-	-	.20	.22	.28	.17	.21	.23	.25	.29	.31	.35	.08	.03	.04	.18	-	-	.06	.04
Marks in General Science	.08	-	-	-	-	-	.04	-	.02	-	.01	.01	.03	.02	.03	.02	.05	.03	-	-	-	-	-	-	-
Rating of Music Objectives	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Credits in Music	.01	-	.03	-	-	-	-	.01	-	.01	-	-	.01	-	-	.07	.01	-	.01	.02	.01	-	-	.04	.06
Marks in Music	.12	-	-	-	-	-	.02	.05	.07	.07	.06	.07	.10	.07	.11	.17	.10	.04	.04	-	-	-	-	-	-

[1] Showing adjusted Eta-squared results, where Eta-squared is greater than .01 and the level of significance greater than .01.
[2] Dependent variables and predictors are listed in full in Appendidix C.

Sex. Variable 63, sex of respondent, showed fairly consistent though low relationships with most of the dependent variables. No significant Etas were found for career satisfaction nor for three of the subject areas (Social Studies, Science, Music) on the ratings of the objectives.

Student ability. Scholastic Aptitude Test results, (v64-verbal,v65-quantitative,v66-total), as predictors for the selected quality indicators, accounted for variance in a range up to approximately 25%. Each of these predictors was intercorrelated and since variable 66 (T-SCAT) showed consistently higher results it was selected for further analysis.

Past achievement. With few exceptions, grade nine achievement scores (v67-v73) showed predictability for each of the quality indicators, in a range slightly higher than the ability scores. Again, because of the high intercorrelations and the higher predictability of the grade nine average (v73), scores in the individual subject areas (v67-v72) were dropped in subsequent analyses, and only the average was included.

Self-report antecedent variables. Of the antecedent data supplied through student self reporting (v74 through v78), student self ability rating (v74) and career plans (v78) showed the highest level of predictability. As with the ability and past achievement predictors, predictability was found over most of the dependent variables, with career satisfaction and the rating of subject area objectives as exceptions.

School antecedent variables. Neither the region of the province (v79) nor the urban-rural split was significantly associated with

variance in the quality indicators. School codes (v81) and to a lesser extent, district codes (v82) showed predictability of variance in the outcome measures shown. Since handling variables which have large numbers of categories is difficult and costly in multi-factor analysis, the school and district identifying variables were not selected. A number of schools and districts were however selected for comparative analysis in the information phase of the study which is reported in the next chapter.

In summary, one-way analysis of variance was undertaken for each of the independent variables (v54,v55 and v58-v82) using selected indicators of quality education as the dependent variables. Generally, the predictability of the independent variables was similar from one dependent variable to the next. Based on the extent of variance in the outcome measures accounted for as evidenced by Eta^2 shown in Table 5, seven variables accounting for the greatest amount of variance were selected for further analysis. These seven were student program (v54), pupil-teacher ratio (v58), sex of respondent (v63), T-SCAT ability score (v66), grade nine average (v73), self ability rating (v74), and career plans (v78).

Total Variance Accounted For and Relative Explanatory Power

> Sub-problem 3: to determine, for selected indicators of quality education, the total variance which is accounted for by the student-based and school-based variables and the explanatory power of each of these variables.

The third sub-problem had, as its objectives, the determination of the extent to which the student-based and school-based variables as a group, accounted for variance in the quality indicators; the

identification of differences in the explanatory power from one indicator to the next; and the discovery of the relative explanatory power of the various student-based and school-based (predictor) variables.

A monitoring system of the type proposed in Chapter 2, ideally should include those independent variables which account for all of the variance in the indicators of quality education used. Therefore, it would be important to include within the monitoring system an on-going check of the extent to which the variables selected were achieving this ideal. In addition, should remedial action be necessary, a ranking of those transactional and antecedent (predictor) variables which account for the greatest amount of variance in the outcome variables would be helpful in directing further action, or at least in providing direction for more in-depth evaluation.

Because some of the predictor variables were nominal rather than continuous variables, the statistical analysis selected for this task was Multiple Classification Analysis, which is similar to multiple regression analysis when using dummy variables. Two different approaches were used, one to determine the predictability of the total group of independent variables and the relative explanatory power of each of the predictors when the others were held constant and the second, to determine the marginal contribution to the total variance for each of the predictor variables.

Multiple Classification Analysis (MCA) assumes an additive model with no interaction between predictor variables. With this statistical technique, the predictor variables may be of a nominal nature, while the dependent variable must be of the interval type.

Since this phase of the research was exploratory and intended merely to illustrate types of analyses that could be undertaken in a complete monitoring system analysis, it was delimited to a few general outcomes and a selected number of subject area outcomes.

Explanatory Power Holding Other Variables Constant

For this analysis, the number of predictors was limited to student program, pupil-teacher ratio, sex, student ability (T-SCAT), and grade nine average. Two predictors, self ability ratings and student career plans, which had shown promise in the earlier analysis were dropped from the analysis since their use would have resulted in a decrease in the available "N" which in turn could have introduced some bias. The results of the Multiple Classification Analyses are presented in Table 6.

General outcomes. The highest degree of association, between the predictors and the general outcomes, was found for the two internal measures tested. Over 52% of the variance was accounted for in the case of the "level of high school achievement," while in the prediction of the average high school mark, over 56% of the variance was accounted for by the five predictor variables. Of the three external outcomes selected for analysis (further education, Pineo-Porter ranking, and career satisfaction), the highest degree of association was found for the measurement of further education, where 31% of the variance was accounted for. Very low predictability was found for the career satisfaction variable with only about 1% of the total variance accounted for.

TABLE 6

TOTAL EXPLANATORY POWER AND RANK ORDERING OF PREDICTORS WHILE HOLDING OTHER VARIABLES CONSTANT

Outcomes	"N"	Adjusted Multiple R^2	Predictors[1]: High School Program	Pupil-Teacher Ratio	Sex of Student	T-SCAT Ability Score	Grade 9 Average
General Outcomes							
High school achievement level	2753	.5227	.5261	.0823	.0369	.0647	.3298
Average high school mark	2753	.5609	.2948	.1168	.1835	.0546	.5335
Further education	706	.3096	.2707	.1554	.2189	.0896	.2889
Pineo-Porter ranking	706	.1599	.1911	.1927	.2153	.1127	.1802
Career satisfaction	706	.0119	.1112	.1583	.0514	.1172	.1345
Subject Area Outcomes							
Rating of English objectives	536	.0279	.1189	.1837	.1567	.1944	.1059
Credits in Matriculation English	2266	.6648	.5511	.0907	.0637	.0514	.3213
Marks in Matriculation English	2266	.5303	.2569	.0973	.2346	.0657	.4829
Rating of Social Studies objectives	659	.0113	.1115	.1874	.0645	.1562	.1568
Credits in Social Studies	2727	.5676	.6066	.0792	.0356	.0376	.2050
Marks in Social Studies	2727	.4793	.2466	.0871	.0810	.0646	.4987
Rating of Science objectives	172	.0986	.3426	.4854	.0604	.2897	.2734
Credits in General Science	1025	.4333	.3520	.0919	.0260	.1132	.2945
Marks in General Science	1025	.1389	.2224	.1596	.1663	.1042	.2235
Rating of Music objectives	84	.0376	.4391	.4877	.0937	.6581	.1558
Credits in Music	311	.0385	.1421	.1268	.0382	.0629	.0722
Marks in Music	311	.1296	.1938	.2713	.0717	.1428	.3429

[1] Entries show overall multiple R^2 and individual beta weights for each predictor.

The predictor variables with the highest predictability overall were the student program and the grade nine average. As the individual beta scores in Table 6 reveal, student program type was the highest predictor for the level of high school achievement. The grade nine average however was the best predictor for the average high school mark. The sex of the student showed higher relative predictability in the case of average high school marks than was the case with high school achievement. Of interest, in view of the earlier ANOVA results, was the relative low predictability discovered in the case of the ability rating as measured by the T-SCAT score.

Both high school program type and the grade nine average had equal beta weights when predicting the number of years of further education. Sex was the variable which accounted for the greatest amount of variance in the Pineo-Porter occupational ranking, and accounted for a significant amount of the variance in the case of the further education outcome.

Subject area outcomes. Two internal outcome measures and the rating of objectives were selected for analysis using four illustrative subject areas: Matriculation English, Social Studies, General Science, and Music. Of the 17 subject areas included, these four were selected as examples for the purpose of representing a matriculation subject, a core subject, a non-matriculation subject, and an optional subject respectively. The proportion of variance in these subject area outcomes explained by the five predictors is shown in the lower part of Table 6. The highest proportion of variance was explained in the case of the number of matriculation English credits taken (66%) and the lowest by the number of credits taken in Music

(4%). This reduction in the proportion of the variance explained, is mostly a result of the adjustment factor applied due to the smaller "N's" in the case of General Science and Music.

The individual beta scores for each of the five predictors used reveal that high school program was highly predictive of the number of credits taken by students in the various subject areas, while the grade nine average was highly predictive of the average marks received in these subject areas during high school.

Marginal Explanatory Power of Predictors

In attempting to determine the relative explanatory power of the respective predictors, the approach reported in the preceding paragraphs "controlled" the other variables by holding their influence constant. Andrews (1973) suggests an alternative approach which identifies the "marginal" contribution of each predictor variable. This procedure first computes a coefficient of multiple correlation with all the predictors involved and then a new coefficient with the specified predictor removed. By comparing the two coefficients, the marginal contribution of the specific predictor can be determined. The result is usually reported in terms of the proportion of variance which is explained by the addition of the predictor and that proportion of the variance which is not explained by the other predictors in the set.

Following this procedure, marginal explanatory power for each of the five predictors was computed and is shown in Table 7 using the selected internal outcomes as dependent variables in turn. The

TABLE 7

MARGINAL EXPLANATORY POWER OF EACH OF FIVE SELECTED PREDICTORS

Predictors	Outcomes[1]							
	High School Achievement	High School Average	Credits in Matriculation English	Marks in Matriculation English	Credits in General Science	Marks in General Science	Credits in Social Studies	Marks in Social Studies
Program Type	.1926	.0727	.1816	.0461	.0751	.0394	.2284	.0450
Pupil-Teacher Ratio	.0015	.0086	.0045	.0057	.0021	.0146	.0032	.0090
Sex of Respondent	.0012	.0297	.0035	.0503	.0004	.0210	0	.0058
Ability (T-SCAT)	.0007	.0032	.0027	.0014	.0048	.0006	.0019	.0022
Grade 9 Average	.0253	.0762	.0275	.0671	.0253	.0183	.0124	.0619

[1]Showing the difference between the multiple R^2 with all five predictors and the multiple R^2 without the predictor in question

student program variable demonstrates the highest marginal explanatory power when predicting the level of high school achievement (.19). It was also highest when predicting the number of credits achieved in each subject area. The grade nine average had the highest marginal explanatory power when predicting high school average (.08) and when predicting average marks in English and Social Studies (.07 and .06) but not in General Science (.04) where the student program was again the best predictor.

The amount of variance accounted for marginally in the case of student program ranges from a low of four percent in the case of marks in General Science to a high of 23 percent in predicting credits earned in Social Studies. Nineteen percent of the variance in the dependent variable "high school achievement" is accounted for by the program followed by the student, over and above the predictability of the other variables.

Table 7 shows that two percent of the variance in General Science (.02) and five percent of the variance in Matriculation English marks (.05) as well as three percent of the variance in the overall high school average (.03) is accounted for by the sex of the student. This is a marginal contribution, in addition to the contribution of other variables such as student ability or previous achievement scores. A very low marginal contribution to variance in the outcomes was found in the case of the T-SCAT ability rating (.005 or less).

In summary, it was found that over 50% of the variance in high school achievement level and in the average high school mark was accounted for by the five predictors identified for analysis (Table 6). Predictability for all three subject area outcomes (rating of

objectives, credits received, marks attained) varied from high in Matriculation English to a low in Music. The approach of holding the influence of the other variables constant and the marginal contribution approach, both demonstrated the significant degree of association between the program that the student follows in high school and the students' achievement of most of the internally measured outcomes. To a lesser extent, but more than for other predictors, the high school program was also found to be significantly associated with the externally measured outcomes.

Summary

This chapter has presented the results of the inductive inquiry phase, which encompassed the first three sub-problems of the study.

Sub-problem 1: A total of 20 general indicators of quality education and seven subject area specific indicators were identified from the available data.

Sub-problem 2: Of the 25 student-based and school-based predictor variables, seven were identified as accounting for the greatest amount of variance in the indicators of quality education. These included student program, pupil-teacher ratio, sex of respondent, T-SCAT ability score, grade nine average, self ability rating, and career plans. The first five were carried forward for further analysis.

Sub-problem 3: Up to 56% of the variance was accounted for by the five predictor variables; this in the case of predicting the high school average mark. Overall, the high school program followed by the student accounted for the most variance in the outcome measures. Although predictability was lower for the externally measured

outcomes, up to 30% of the variance was accounted for, even though these outcomes were gathered five years after the students had left school.

The following chapter continues with the presentation of the findings of the study, focusing on the last three sub-problems which formed the informational phase of the monitoring model developed for this study.

CHAPTER 6

RESULTS: INFORMATIONAL PHASE

The preceding chapter dealt with the first three sub-problems of the study. This chapter presents the results associated with the remaining three sub-problems. These sub-problems formed the Information Phase of the monitoring system proposed.

Sub-problem 4 called for the computation of provincial norms for each of the indicators of quality education that are identified in the previous chapter. These norms, as well as having the potential for comparison at the provincial level at different points in time, serve as bench mark indicators for comparison with the level of educational quality experienced by various student sub-groups and the level of educational quality provided by various sub-systems within the province. The analysis associated with the fifth sub-problem compared achievement levels on the indicators of quality education for various student sub-groups based on student characteristics and student high school program variables. These variables had previously been found to be significantly associated with variance in the educational outcomes. The sixth and final sub-problem required a similar disaggregation of the quality indicators according to school-based variables and displaying of the quality indicators for selected schools and school districts for illustrative purposes.

While it has been shown in the previous chapter that each of the student-based and school-based variables was associated with a significant amount of variance in the outcome measures as well as the

degree or extent of association, the detail of this involvement remains to be shown. For example, since the variable "sex of the respondent" was shown to be associated with variance in high school marks, the question which remains is: did the males or the females receive the higher grades?

Provincial Norms for Quality Indicators

Sub-problem 4: to compute provincial norms for each indicator of quality education.

The indicators of quality education selected were listed in Table 3. In the "general" category are three indicators of quality education reflecting outcomes measured internally or within the school, five indicators measuring external outcomes of a career achievement nature, and external ratings of the 12 goals of education. The subject area indicators of quality education listed in Table 4 included three indicators dealing with the extent of student participation in each subject area and three indicators dealing with the marks achieved and the distribution of these marks within each subject area. Objective ratings which were externally measured via the followup questionnaire were also included as indicators of quality education.

The provincial norms that were calculated for both general and subject area quality indicators follow.

Provincial Norms for General Indicators of Quality Education

The norms based on the provincial sample, 2753 records in the case of the internal indicators and a 26% return of 710 in the case of the external indicators, are presented in Table 8. Overall, 65.1% of

TABLE 8

PROVINCIAL NORMS FOR GENERAL QUALITY INDICATORS

Indicators		Norm
Internal:	N=	(2753)
Percent achieving high school diploma		65.1
Percent achieving matriculation status		30.5
Average of high school marks		61.6
External:	N=	(710)
Average years of further education		1.7
Percent unemployed and seeking a job		5.8
Average Pineo-Porter job status level		46.5
Percent earning over $12,000		31.1
Percent satisfied/very satisfied with career		64.4
Overall goal' rating (%adeq./very adeq.)		55.3
# 1 Basic Competencies (%adeq./very adeq.)		69.2
# 2 Use Information (%adeq./very adeq.)		69.1
# 3 Communication Skills (%adeq./very adeq.)		65.4
# 4 Health, Fitness, Safety (%adeq./very adeq.)		60.5
# 5 Respect Others (%adeq./very adeq.)		58.1
# 6 Desire Learning (%adeq./very adeq.)		59.2
# 7 Understand Changes (%adeq./very adeq.)		56.1
# 8 Good Citizenship (%adeq./very adeq.)		53.8
# 9 Leisure Time (%adeq./very adeq.)		51.3
#10 Appreciate Culture (%adeq./very adeq.)		45.4
#11 Management Skills (%adeq./very adeq.)		45.0
#12 World of Work (%adeq./very adeq.)		40.6

'A complete listing and description of the goals of education is provided in Table 3.

the students had met the requirements of a high school diploma and 30.5% of the sample had achieved matriculation in the sense of attaining entrance into a university program. The average of all high school marks was 61.6%.

The norms for indicators relating to career achievement showed an average of 1.7 years of education beyond high school and 5.8% unemployed and seeking a job. For those employed, the Pineo-Porter job status level was 46.5 on the average with a range of 15 to 75, while 31.1% were earning $12,000 per year or more. Close to 65% of the respondents reported that they were either "satisfied" or "very satisfied" with their career.

On the adequacy of the 12 Goals of Education, the percentage of respondents who rated the sub-goals either "adequately" or "very adequately" achieved for them through their school program ranged from a low of 40% for goal #12 (preparation for the world of work) to a high of 69% for goal #1 (develop basic competencies). The development of basic skills and special knowledge competencies (#1); organizing, analyzing and using information (#2); and skills in communication (#3); all were rated adequately or very adequately achieved by 65% or more of the respondents. Three of the goals were rated at least adequately achieved by fewer than 50% of the respondents including: the appreciation of culture and beauty (#10); the management skills associated with economics, natural and human resources (#11); and the development of skills and information related to the world of work (#12). The six remaining goals ranged from 51% to 60% adequacy rating.

Subject Area Quality Indicator Norms

Provincial norms were computed for six different internal subject area quality indicators for each of 17 different subject areas. These indicators, displayed in Table 9, show three different measures of the extent to which students were enrolled in each subject area and three different measures of the level of achievement by students in each subject area. In addition, for those students who took courses in the respective subject areas, the percentage of students rating the various subject area objectives as having been either adequately or very adequately achieved for them, form an externally developed set of quality indicators.

Student participation in subject areas. The average number of credits taken by students in each subject area shows the highest participation to have occurred in Matriculation Science (13.1), Matriculation English (11.4), Business Education (11.5) and Social Studies (10.4). Lowest participation was in the three fine arts areas with an average of approximately one credit per student in each area. The second indicator in Table 9, the percentage of students taking at least one course in the specific subject areas, takes a slightly different perspective on the degree of participation. Social Studies and Physical Education have the highest percentages (99.1% and 97.5%), being the only two specifically compulsory courses in the high school program. Slightly over 55% had taken at least one Second Language course and approximately 25% had taken courses in each of Home Economics (28.1%), Industrial Arts (26.2%) and Vocational Education (24.2%). In the fine arts areas almost twice as many students had

TABLE 9

PROVINCIAL NORMS FOR SUBJECT AREA[1] QUALITY INDICATORS

Indicators	ENG. MAT.	ENG. GEN.	SOC. STUD	SOC. SCI.	MATH MAT.	MATH GEN.	SCI. MAT.	SCI. GEN.	SEC. LANG	ART	DRAM	MUSC	P.ED	BUS.	H.EC	I.A.	VOC.
Internal: N =	(2266)	(1861)	(2727)	(1493)	(1814)	(1396)	(2177)	(1025)	(1519)	(575)	(359)	(312)	(2683)	(2321)	(773)	(720)	(665)
Average credits per student	11.4	5.6	10.4	3.7	8.1	3.9	13.1	1.9	5.6	1.4	0.8	1.0	6.0	11.5	2.2	2.1	4.4
Percentage of students taking 1+ courses	82.3	67.6	99.1	54.2	65.9	50.7	79.1	37.2	55.2	20.9	13.0	11.3	97.5	84.3	28.1	26.2	24.2
Average # of courses (by those taking)	3.1	1.8	2.3	1.6	2.8	1.7	5.3	1.1	2.2	1.6	1.5	1.9	1.4	3.1	1.7	1.7	2.2
Average grade (by those taking)	60.6	61.8	59.7	61.1	59.4	59.4	58.8	59.3	63.1	62.7	66.5	73.3	65.1	63.1	67.7	63.5	65.0
Percentage of A's & B's	44.6	40.2	38.7	40.6	41.0	35.2	39.6	32.4	51.1	54.4	61.4	84.7	57.8	48.6	65.0	48.4	53.4
Percentage of D's & F's	16.2	17.1	20.3	20.3	19.1	25.9	18.6	22.6	14.3	13.8	7.9	2.8	8.1	16.3	9.0	12.3	12.0
External: N =	(536)	(367)	(659)	(222)	(532)	(272)	(576)	(172)	(396)	(146)	(85)	(84)	(653)	(357)	(....)	(132)	(97)
Average adequacy rating	63.5	63.2	63.1	63.9	74.3	64.3	67.8	62.2	42.9	63.7	61.7	67.3	76.6	59.5	....	66.6	73.3
Objective #1 rating[2]	72.6	73.6	56.3	76.6	62.0	60.8	71.5	66.3	24.6	76.6	72.9	63.9	73.8	56.2	....	60.8	71.6
Objective #2 rating	70.2	68.7	64.5	58.6	71.8	60.3	47.5	48.8	25.3	42.8	61.9	63.1	78.9	74.2	....	71.0	75.0
Objective #3 rating	51.6	50.3	54.9	56.6	78.9	64.3	49.6	53.5	72.5	58.6	65.9	77.4	72.2	57.7	....	61.8	72.2
Objective #4 rating	59.4	60.1	74.2	....	84.5	71.7	87.7	78.5	46.1	76.7	67.9	69.0	81.5	48.7	....	72.7	74.2
Objective #5 rating	....	....	69.3	....	....	....	92.4	82.6	42.8	....	40.0	63.1	....	61.5	....	....	....
Objective #6 rating	....	....	54.8	....	....	....	76.0	64.3	55.2	....	....	....	....	57.4	....	....	....
Objective #7 rating	....	....	74.0	....	....	....	49.8	41.7	33.8	....	....	....	....	60.9	....	....	
Objective #8 rating	....	....	60.2	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Objective #9 rating	....	....	60.0	....	....	....	....	....	....	....	....	....	....	....	....	....	

[1]Subject area abbreviations are as follows:

ENG. MAT. - Matriculation English
ENG. GEN. - General English
SOC. STUD - Social Studies
SOC. SCI. - Social Science
MATH MAT. - Matriculation Mathematics
MATH GEN. - General Mathematics
SCI. MAT. - Matriculation Science
SCI. GEN. - General Science
SEC. LANG - Second Language
DRAM - Drama
MUSC - Music
P.ED - Physical Education
BUS. - Business
H.EC - Home Economics
I.A. - Industrial Arts
VOC. - Vocational Education

[2]The specific objectives referred to for each subject area can be found in Appendix "A".

taken courses in Art as in Music (21% versus 11%), with Drama falling between the two (13%). When Mathematics is compared with Science, it is evident that a greater proportion of students participated in General Mathematics courses (51%) than in the General Science courses (37%). Conversely, a greater proportion of students participated in Matriculation Science (79%) than in Matriculation Mathematics (66%).

For those students who had taken courses in each subject area, the third indicator shows the degree of involvement in the subject area. The measure used was average number of courses taken in the subject. The highest number appears in the Matriculation Sciences (5.3 courses) partly due to the large number of three credit or "half" courses in science rather than the five credit "full" courses common in other subject areas. On the average, students who were enrolled in Matriculation English and those enrolled in Business Education took over three courses in the respective fields.

Student achievement in subject areas. The assumption that the quality indicators dealing with student marks are entirely a measure of student achievement that can be compared from subject area to subject area cannot be justified, as at least to some extent the indicators may merely reflect different grading practices in the various subject areas. In either event, the comparison of these indicators may raise questions for further study and at least provide a provincial standard for comparison within subject areas.

As evident in Table 9, the average grades were highest in Music (73.3%) and lowest in the Mathematics and Science areas (58.8% to 59.4%). With respect to letter grades (A, B, C, D, F), Music is again highest with 84.7% of the students receiving grades of either A or B

and only 2.8% either a D or an F. General Mathematics along with General Science show the largest percentage of failures as defined by the grades of D or F (25.9% and 22.6% respectively). This large percentage of low grades raises some concerns over the effectiveness of the curriculum and instruction in these subject areas, or of the assessment procedures used which may be setting unrealistic standards. It is also evident from the table that larger percentages received grades of D or F in Social Studies (20.3%) than in either of the English streams (16.2% and 17.1%), suggesting the need for more in-depth examination to determine the source of these differences.

Ratings of subject area objectives. For the so-called external indicators of educational quality, namely the student ratings of the various educational objectives, it is evident that for most subject areas about 60% of the students rated the objectives as having been either adequately or very adequately achieved. Physical Education, Matriculation Mathematics, and Vocational Education had the highest percentages of responses in these two categories, all over 70%. Based on these indicators, the subject area of major concern would seem to be Second Languages, where the average adequacy rating by students was 43%, with the adequacy ratings for individual objectives varying from a low of 24.6% for objective #1 to a high of 72.5% for objective #3.

Although detailed examination of the ratings for each of the subjects and each of the individual objectives was not undertaken, it is noteworthy that for Second Languages, two of the objectives received relatively high average ratings while the others received ratings that were extremely low in relation to the other objectives. Further examination of these specific objectives may be of help to

curriculum designers working in that area. Another subject area where the differences from objective to objective are quite great is the Matriculation Science, where three of the objectives had been rated at least adequately achieved by fewer than 50% of the students while the overall average adequacy rating in this subject area was greater than 65%. More in-depth evaluations would be required to determine the causes of these discrepancies.

Summary

Provincial norms computed for the general quality indicators showed 65% achieving a high school diploma and 35% attaining matriculation status. The average high school mark was 61.6%. The career based indicators of quality education included provincial norms of 1.7 years of further education and 65% satisfied or very satisfied with their career. The average rating over all 12 goals of education was 55% adequate or very adequate.

The subject area quality indicators computed provincially included measures of the extent of participation by students, levels of achievement in the subject areas, and ratings of the subject area objectives. The highest average number of credits in the subject areas was recorded for Matriculation English, with Business Education and Social Studies following. The highest percentage of students taking at least one course was found within Social Studies, followed by Physical Education. The average grade achieved varied from a high of 73% in Music, to a low of 59% in Matriculation Science. Adequacy ratings of the objectives were highest for Physical Education and lowest for Second Languages.

Disaggregation According to Student Characteristics and Program

Sub-problem 5: to identify, for selected indicators of quality education, differences among groups of students classified on the basis of student programs and student characteristics.

Earlier analyses revealed that of the student-based variables, the student's sex, previous achievement, career plans, and school program were among the variables most closely associated with variance in the quality indicators tested. This section, along with the subsequent section, focus on sub-problem five. Here, the quality indicators under study are disaggregated to selected sub-groups based on the independent variables identified earlier. These disaggregations (computations of the quality indicators for sub-groups within the sample) follow; first focusing on student characteristics, next focusing on student programs, and finally, focusing on various combinations of these student-based antecedent and transactional variables. This section deals with the general quality indicators, while the disaggregation of the quality indicators specific to the various subject areas is reported in the subsequent section. The reporting of results based on institutional factors is dealt with in the later part of the chapter.

General Indicators and Student Characteristics

Table 10 presents a cross tabulation of both internal and external general indicators of educational quality based on selected student characteristics.

Sex. Examination of these results reveals females on the average scoring higher on just about every quality indicator. Over 10% more

TABLE 10

GENERAL QUALITY INDICATORS
IN ASSOCIATION WITH SELECTED STUDENT CHARACTERSITICS

Indicators	Norm	Sex[1]		Achievement[2]			Plans[3]			
		M	F	L	M	H	UNIV	COLL	WORK	OTHR
Internal:	N= (2753)	(1405)	(1348)	(936)	(936)	(881)	(692)	(584)	(489)	(496)
Percent achieving high school diploma	65.1	59.9	70.5	44.4	65.5	86.7	86.7	71.7	56.0	65.5
Percent achieving matriculation status	30.5	28.5	32.6	1.4	21.4	71.2	67.5	23.5	4.9	29.1
Average high school mark	61.6	59.4	64.0	56.4	59.9	69.2	67.1	62.1	59.4	61.6
External:	N= (710)	(340)	(370)	(176)	(236)	(298)	(237)	(178)	(100)	(106)
Average years of further education	1.7	2.0	1.4	0.7	1.5	2.4	2.7	1.4	0.6	1.2
Percent unemployed and seeking a job	5.8	6.0	5.7	5.7	3.7	7.6	6.9	5.4	2.2	3.1
Average Pineo-Porter job status level	46.5	43.5	50.0	41.2	45.2	50.9	51.5	45.8	41.8	45.3
Percent earning over $12,000	31.1	46.2	14.8	29.8	28.5	33.8	37.0	30.7	29.9	30.9
Percent satisfied/very satisfied with career	64.4	64.2	64.7	64.0	64.4	64.8	71.1	63.3	66.3	55.2
Overall goal rating (%adeq./very adeq.)	55.3	53.3	57.3	56.6	57.3	53.0	53.2	59.7	56.4	54.5
#1 Basic Competencies (%adeq./very adeq.)	69.2	67.5	70.7	66.7	69.8	70.2	71.8	74.0	65.8	66.0
#2 Use Information (%adeq./very adeq.)	69.1	71.4	66.9	63.2	65.6	75.2	76.5	68.7	63.5	63.2
#3 Communication Skills (%adeq./very adeq.)	65.4	61.9	68.2	69.0	59.7	67.7	62.6	67.0	65.9	66.7
#4 Health, Fitness, Safety (%adeq./very adeq.)	60.5	59.5	61.7	65.1	66.1	53.5	61.0	66.3	55.8	62.6
#5 Respect Others (%adeq./very adeq.)	58.1	55.1	61.0	55.4	60.7	57.7	58.9	56.0	56.9	57.7
#6 Desire Learning (%adeq./very adeq.)	59.2	57.8	60.7	51.2	59.8	63.1	68.3	62.5	47.3	56.0
#7 Understand Changes (%adeq./very adeq.)	56.1	55.1	57.0	56.5	59.1	53.4	52.3	63.4	58.9	54.2
#8 Good Citizenship (%adeq./very adeq.)	53.8	53.7	53.9	58.6	55.2	49.8	50.3	56.3	60.3	54.6
#9 Leisure Time (%adeq./very adeq.)	51.3	48.0	54.4	54.2	54.2	47.3	50.0	53.0	49.5	55.2
#10 Appreciate Culture (%adeq./very adeq.)	45.4	44.1	46.6	47.4	53.9	37.3	34.4	53.5	55.9	47.6
#11 Management Skills (%adeq./very adeq.)	45.0	41.3	48.5	57.1	46.2	37.0	33.6	53.0	55.4	47.2
#12 World of Work (%adeq./very adeq.)	40.6	33.9	46.7	42.4	43.9	36.8	35.0	51.1	42.6	33.3

[1]Sex: "M" - male, "F" - female
[2]Achievement: "L" - low, "M" - medium, "H" - high
[3]Plans: "UNIV" - university, "COLL" - college, "WORK" - work after high school, "OTHR" - other plans

of females than of males achieved a high school diploma (71% versus 60%), and 4% more of females than of males achieved matriculation status (33% versus 29%). Over the entire sample, the average high school mark was 5% higher for the females than the males (64% versus 59%). For the career achievement indicators, males showed higher average number of years of further education (2.0 versus 1.4) and a higher percentage of respondents earning over $12,000 per year (46% versus 15%). However, unemployment was very slightly lower (5.7% versus 6.0%) for females and the job prestige rating was higher by 6 1/2 points on the Pineo-Porter scale. Females in general also rated the goals of education more adequately achieved for them than did males. The overall goal rating was four percentage points higher for females and all but one of the individual goals (#2, concerned with using information) were generally rated higher by females.

Previous achievement. The sample was divided into three approximately equal sub-samples based on the average of grade nine achievement. Approximately 21% more of students in the middle prior achievement group than of those in the low prior achievement group, and 21% more of students in the high group than of those in the middle group, attained a high school diploma. In relation to percent achieving matriculation status, less than 2% of the low prior achievement group did so, with 21% of the students in the middle group attaining matriculation standing. This percentage jumped to 71% for the high prior achievement group. The average high school mark also increased as one moves from low to high prior achievement groups (56.4% for low achievers, 59.9% for medium achievers, and 69.2% for high achievers) as shown in Table 10.

With the exception of the unemployment indicator, the career achievement indicators for the three sub-groups also increased as one moves from low to medium to high prior achievers, but the differences between groups are not as dramatic as for the previously mentioned internal quality indicators. The lowest unemployment rate (3.7%) was found for the middle group, with 5.7% and 7.6% unemployment for the low and high prior achievement groups respectively. The average years of further education ranged from .8 for the low achievement group to 2.4 for the high group. The job status level increases from group to group. The percentage of persons earning over $12,000 per year is shown to be slightly higher for the high achievement group than for the low and middle groups which are about the same at approximately 29%. The level of career satisfaction seems to have been approximately the same for each achievement group.

The overall goal ratings are about the same for the low and middle prior achievement groups but about four percentage points lower for the high achievement group. Examination of the individual goal ratings however, shows that some of the goals (#1, #2 and #5) were rated higher by the high achievement group. Goals #4, and #6 - #12 were rated higher by the low and middle achievement groups. Perhaps this difference was a result of the school program followed by the high achievement students. This possibility is examined later in the chapter.

Career plans. The quality indices for each of the sub-groups, which were created on the basis of career plans of the students, are also shown in Table 10. The substantial differences among means for the four career groups in percent achieving a diploma, percent

achieving matriculation status and high school marks attained reveals the strong relationship which seems to exist between student career plans and high school achievement. Less further education, but a lower unemployment rate is evident for students who had planned to enter work immediately after high school (work column). While a somewhat higher percentage of university bound students achieved higher levels of job status, wages, and career satisfaction they also showed higher unemployment rates.

A higher percentage of students who had planned to go to college rated most of the goals as having been adequately or very adequately achieved. This generalization also applied to the overall goal rating.

General Indicators and Student Programs

The school program, or specific cluster of courses taken by each student, has been shown earlier as the one variable most associated with variance in the quality indicators examined. This association is most evident when the influence of other variables is controlled, as reported in the preceding chapter. Table 11 compares the computations of the general quality indicators for the four sub-samples based on student program. The four subsequent tables show the quality indicators for each program further broken down by the student characteristics reported on earlier. This type of double disaggregation was carried out to examine the extent to which each program "serves" different groups of students.

Internal indicators. A higher percentage of students in the

TABLE 11

GENERAL QUALITY INDICATORS
IN ASSOCIATION WITH STUDENT PROGRAMS SHOWING STUDENT CHARACTERISTICS

Indicators		Norm	Program Type: Business	Vocational	Matriculation	General
Internal:	N=	(2753)	(244)	(212)	(1435)	(862)
Percent achieving high school diploma		65.1	65.6	55.2	84.3	35.5
Percent achieving matriculation status		30.5	0.8	2.4	55.8	3.7
Average high school mark		61.6	62.5	58.4	65.7	55.4
External:	N=	(706)	(60)	(37)	(461)	(148)
Average years of further education		1.7	0.5	1.2	2.1	1.0
Percent unemployed and seeking a job		5.8	0	0	5.6	10.2
Average Pineo-Porter job status level		46.5	44.3	39.4	49.4	41.1
Percent earning over $12,000		31.1	13.7	52.8	31.7	30.0
Percent satisfied/very satisfied with career		64.4	58.3	73.0	65.7	60.8
Overall goal rating (%adeq./very adeq.)		55.3	64.1	59.3	54.1	54.6
#1 Basic Competencies (%adeq./very adeq.)		69.2	75.4	72.4	69.3	65.7
#2 Use Information (%adeq./very adeq.)		69.1	75.4	68.4	71.8	58.5
#3 Communication Skills (%adeq./very adeq.)		65.4	78.5	66.8	64.0	63.4
#4 Health, Fitness, Safety (%adeq./very adeq.)		60.5	61.7	63.5	60.2	60.5
#5 Respect Others (%adeq./very adeq.)		58.1	63.3	60.8	57.9	56.2
#6 Desire Learning (%adeq./very adeq.)		59.2	59.3	57.1	62.1	50.7
#7 Understand Changes (%adeq./very adeq.)		56.1	69.7	64.5	54.3	53.9
#8 Good Citizenship (%adeq./very adeq.)		53.8	59.0	54.8	52.2	56.5
#9 Leisure Time (%adeq./very adeq.)		51.3	58.7	55.3	49.7	53.6
#10 Appreciate Culture (%adeq./very adeq.)		45.4	51.6	52.6	43.1	48.0
#11 Management Skills (%adeq./very adeq.)		45.0	62.3	52.6	39.1	54.2
#12 World of Work (%adeq./very adeq.)		40.6	59.0	47.4	38.0	39.2
Student Characteristics						
Sex (% male, female)		51/49	13/87	83/17	48/52	60/40
Ability(% low, medium, high)		33/34/33	65/30/5	52/32/14	13/36/51	53/34/13
Achievement (% low, medium, high)		34/34/32	66/30/4	58/34/8	8/37/55	62/30/8
Plans (% univeristy, college, work, other)		53/20/9/18	1/30/55/15	7/28/52/13	48/25/7/19	11/28/34/27

Matriculation program achieved a diploma (84%) and matriculation standing (56%); in addition the high school average was highest for these students (65.7%). Rough distributions for the other important independent variables are shown at the bottom of Table 11 and must be considered in the interpretation of these comparisons. For example, 52% of those in the Matriculation program were females, 55% were from the high achievement group, and 48% reported plans to go to universiy.

The percentage of students achieving a diploma who had followed a General program was 20 points lower than for those in the Vocational program and 30 points lower than those in the Business program, all of which had students with similar ability and prior achievement levels as shown in Table 11. Very low percentages of students achieved matriculation status from programs other than the Matriculation program. Even in this case, only 55% actually achieved matriculation status. The average high school mark was 63% for the Business, 58% for the Vocational, and 55% for the General programs.

External indicators. The average number of years of further education was higher for Matriculation students and Vocational students and lower for General and Business students. Respondents from Business and Vocational programs reported no unemployment, while the rate was 5.6% for students from the Matriculation program and 10.2% for students from the General program. Students from the Matriculation, Business, General and Vocational programs reported being employed in vocations having prestige ratings of 49.4, 44.3, 41,1 and 39.4 respectively. Fifty three percent of graduates of the Vocational program reported earning $12,000 or more annually, whereas just over 31% of those from each of the Matriculation and General

programs did so; for the graduates of the Business program the figure was 13.7%. The percentage for the career satisfaction item followed much the same pattern with 73% of Vocational graduates reporting that they were satisfied or very satisfied with their chosen careers and 66% of Matriculation graduates, 61% of General graduates, and 58% of Business graduates make this claim.

The overall goal rating was found to be highest for the Business program with a 64% adequacy rating, followed by the Vocational program at 59% and the General and Matriculation programs nearly identical at 54%. The ratings of seven of the 12 individual goals (#1, #3, #5, #7, #9, #10, #12) were similar, with the adequacy rating for the Business program highest, followed by the Vocational program, followed by nearly identical ratings in the Matriculation and General programs. Exceptions to this pattern were as follows:

a. goal #2 (use information) - the Matriculation rating was second to that of Business,

b. goal #4 (health, fitness, safety) - the ratings for all four programs were very close,

c. goal #6 (desire learning) - the rating for the Matriculation program was highest and the rating for the General program was notably lower,

d. goal #8 (good citizenship) - the General rating was second to that of Business,

e. goal #11 (management skills) - the General rating was second to that of Business.

Goal ratings within each program which stand out in that they differ significantly from the ratings established by the overall provincial

norms, included:

a. Business - goal #7 (understand changes) and goal #11 (management skills) were rated higher in relation to the other goals than would be expected based on the norms,

b. Vocational - goal #7 (understand changes) was rated higher in relation to the other goals than would be expected based on the norms,

c. Matriculation - goal #6 (desire learning) was rated higher in relation to the other goals than would be expected based on the norms, and

d. General - goal #8 (good citizenship) and goal #11 (management skills)were rated higher, while goal #6 (desire learning) was rated lower in relation to the other goals than would be expected based on the norms.

Student Programs and Student Characteristics

A further breakdown of the above data according to the various student characteristics is presented for each of the four student programs (Business, Vocational, Matriculation, and General) in Tables 12 through 15. Following are attempts to point out only major areas of difference or similarity. Where the numbers of students were considered too small for meaningful comparisons the results were omitted from the tables.

Internal indicators: sex of respondent. In relation to the percentage achieving a high school diploma, females were higher in all four programs. However, the difference between the sexes was greatest

TABLE 12

GENERAL QUALITY INDICATORS: STUDENTS ENROLLED IN THE BUSINESS PROGRAM
IN ASSOCIATION WITH SELECTED STUDENT CHARACTERISTICS

Indicators		Norm	Sex[1]		Achievement[2]			Plans[3]			
			M	F	L	M	H	UNIV	COLL	WORK	OTHR
Internal:	N=	(244)	(32)	(212)	(161)	(74)	(9)	(3)	(57)	(112)	(32)
Percent achieving high school diploma		65.6	56.3	67.0	64.6	64.9	88.9	-	70.2	75.0	50.0
Percent achieving matriculation status		0.8	3.1	0.5	0.6	1.4	0	-	0	0.9	0
Average high school mark		62.5	59.3	63.0	61.4	64.0	70.3	-	64.0	63.5	59.0
External:	N=	(60)	(6)	(54)	(41)	(18)	(1)	(1)	(17)	(25)	(10)
Average years of further education		0.5	-	0.4	0.5	0.3	-	-	0.6	0.1	0.6
Percent unemployed and seeking a job		0	-	0	0	0	-	-	0	0	0
Average Pineo-Porter job status level		44.3	-	45.5	43.4	45.8	-	-	44.2	46.2	40.6
Percentage earning over $12,000		13.7	-	13.0	8.6	26.7	-	-	0	20.0	22.2
Percent satisfied/very satisfied with career		58.3	-	59.3	56.1	66.7	-	-	58.8	64.0	50.0
Overall goal rating (%adeq./very adeq.)		64.1	-	64.0	61.8	67.7	-	-	62.0	65.8	61.4
#1 Basic Competencies (%adeq./very adeq.)		75.4	-	77.3	76.8	71.0	-	-	82.3	73.1	75.0
#2 Use Information (%adeq./very adeq.)		75.4	-	75.4	71.9	81.6	-	-	76.4	75.0	60.0
#3 Communication Skills (%adeq./very adeq.)		78.5	-	77.8	81.9	69.7	-	-	78.9	75.0	86.8
#4 Health, Fitness, Safety (%adeq./very adeq.)		61.7	-	61.3	57.9	70.9	-	-	55.7	57.1	66.6
#5 Respect Others (%adeq./very adeq.)		63.3	-	60.2	59.7	69.4	-	-	58.8	65.4	72.2
#6 Desire Learning (%adeq./very adeq.)		59.3		60.0	55.3	68.7	-	-	50.0	60.7	50.0
#7 Understand Changes (%adeq./very adeq.)		69.7	-	68.2	64.6	78.9	-	-	64.7	75.0	65.0
#8 Good Citizenship (%adeq./very adeq.)		59.0	-	57.3	61.0	52.6	-	-	51.0	62.8	76.7
#9 Leisure Time (%adeq./very adeq.)		55.7	-	61.8	56.1	57.9	-	-	52.9	57.7	50.0
#10 Appreciate Culture (%adeq./very adeq.)		51.6	-	50.9	50.0	52.6	-	-	55.9	63.5	25.0
#11 Management Skills (%adeq./very adeq.)		62.3	-	61.8	63.4	57.9	-	-	47.1	65.4	70.0
#12 World of Work (%adeq./very adeq.)		59.0	-	58.2	46.3	84.2	-	-	64.7	57.7	50.0

[1]Sex: "M" - male, "F" - female
[2]Achievement: "L" - low, "M" - medium, "H" - high
[3]Plans: "UNIV" - university, "COLL" - college, "WORK" - work after high school, "OTHR" - other plans

TABLE 13

GENERAL QUALITY INDICATORS: STUDENTS ENROLLED IN THE VOCATIONAL PROGRAM
IN ASSOCIATION WITH SELECTED STUDENT CHARACTERISTICS

Indicators		Norm	Sex[1]		Achievement[2]			Plans[3]			
			M	F	L	M	H	UNIV	COLL	WORK	OTHR
Internal:	N=	(212)	(175)	(37)	(124)	(72)	(16)	(12)	(48)	(89)	(23)
Percent achieving high school diploma		55.2	53.7	62.2	53.2	58.3	56.3	66.7	66.7	56.2	56.5
Percent achieving matriculation status		2.4	2.9	0	0	4.2	12.5	33.3	2.1	0	0
Average high school mark		58.4	57.9	61.2	56.7	59.8	65.8	61.7	59.3	58.9	57.4
External:	N=	(37)	(33)	(4)	(19)	(14)	(4)	(3)	(12)	(15)	(4)
Average years of further education		1.2	1.3	-	0.5	2.5	-	-	2.5	0.3	-
Percent unemployed and seeking a job		0	0	-	0	0	-	-	0	0	-
Average Pineo-Porter job status level		39.4	38.8	-	40.0	35.8	-	-	40.0	35.0	-
Percentage earning over $12,000		52.8	55.9	-	35.3	71.4	-	-	66.7	42.9	-
Percent satisfied/very satisfied with career		73.0	78.8	-	68.4	78.6	-	-	83.3	73.3	-
Overall goal rating (%adeq./very adeq.)		59.3	60.7	-	54.4	64.3	-	-	64.6	60.2	-
#1 Basic Competencies (%adeq./very adeq.)		72.4	73.5	-	57.9	82.1	-	-	79.2	63.3	-
#2 Use Information (%adeq./very adeq.)		68.4	69.1	-	65.8	67.8	-	-	70.8	63.3	-
#3 Communication Skills (%adeq./very adeq.)		66.7	64.5	-	74.2	44.5	-	-	53.4	62.0	-
#4 Health, Fitness, Safety (%adeq./very adeq.)		63.5	64.9	-	70.0	50.1	-	-	66.7	70.9	-
#5 Respect Others (%adeq./very adeq.)		60.8	62.1	-	47.2	78.6	-	-	54.5	66.7	-
#6 Desire Learning (%adeq./very adeq.)		57.1	60.5	-	50.0	62.5	-	-	64.3	62.5	-
#7 Understand Changes (%adeq./very adeq.)		64.5	64.7	-	52.6	75.0	-	-	79.2	50.0	-
#8 Good Citizenship (%adeq./very adeq.)		54.8	56.4	-	55.3	57.1	-	-	41.7	71.1	-
#9 Leisure Time (%adeq./very adeq.)		55.2	58.8	-	57.9	50.0	-	-	66.7	66.7	-
#10 Appreciate Culture (%adeq./very adeq.)		52.6	51.5	-	47.4	71.4	-	-	66.7	53.3	-
#11 Management Skills (%adeq./very adeq.)		52.6	52.9	-	52.6	50.0	-	-	58.3	60.0	-
#12 World of Work (%adeq./very adeq.)		47.4	52.9	-	36.8	64.3	-	-	66.7	40.0	-

[1]Sex: "M" - male, "F" - female
[2]Achievement: "L" - low, "M" - medium, "H" - high
[3]Plans: "UNIV" - university, "COLL" - college, "WORK" - work after high school, "OTHR" - other plans

TABLE 14

GENERAL QUALITY INDICATORS: STUDENTS ENROLLED IN THE MATRICULATION PROGRAM
IN ASSOCIATION WITH SELECTED STUDENT CHARACTERISTICS

Indicators		Norm	Sex[1]		Achievement[2]			Plans[3]			
			M	F	L	M	H	UNIV	COLL	WORK	OTHR
Internal:	N=	(1435)	(684)	(751)	(118)	(527)	(790)	(614)	(320)	(95)	(240)
Percent achieving high school diploma		84.3	81.7	86.7	66.9	79.1	90.4	90.1	81.3	70.5	83.3
Percent achieving matriculation status		55.8	55.7	55.9	8.5	34.9	76.8	72.6	41.3	24.2	51.3
Average high school mark		65.7	64.0	67.2	58.1	61.2	69.8	68.0	64.3	61.7	64.9
External:	N=	(461)	(217)	(244)	(29)	(155)	(277)	(221)	(112)	(24)	(64)
Average years of further education		2.1	2.5	1.7	1.0	1.6	2.5	2.7	1.5	1.0	1.5
Percent unemployed and seeking a job		5.6	5.9	5.4	3.8	3.4	7.0	6.8	3.9	0.0	3.4
Average Pineo-Porter job status level		49.4	47.3	51.5	45.5	46.9	51.3	51.8	47.7	43.9	48.9
Percentage earning over $12,000		31.7	47.4	16.3	41.7	25.7	34.1	37.6	30.8	27.3	27.1
Percent satisfied/very satisfied with career		65.7	66.8	64.8	69.0	63.9	66.4	71.5	64.3	62.5	53.1
Overall goal rating (%adeq./very adeq.)		54.1	52.0	56.1	53.5	56.4	52.9	52.9	58.6	53.6	52.2
#1 Basic Competencies (%adeq./very adeq.)		69.3	68.6	69.9	63.8	69.0	70.0	70.8	71.6	62.0	67.2
#2 Use Information (%adeq./very adeq.)		71.7	75.6	68.4	63.8	64.2	76.9	77.3	67.8	60.4	65.6
#3 Communication Skills (%adeq./very adeq.)		64.0	62.1	65.3	59.2	58.5	67.5	62.6	66.7	61.5	61.9
#4 Health, Fitness, Safety (%adeq./very adeq.)		60.2	58.5	62.0	75.7	69.4	53.2	60.6	66.7	41.7	61.1
#5 Respect Others (%adeq./very adeq.)		57.9	53.4	61.8	46.5	61.7	56.9	58.8	56.6	66.0	53.2
#6 Desire Learning (%adeq./very adeq.)		62.1	60.6	63.7	50.0	59.9	64.4	69.2	62.7	37.5	54.2
#7 Understand Changes (%adeq./very adeq.)		54.3	52.1	56.3	55.2	56.3	53.1	51.4	60.6	60.0	54.7
#8 Good Citizenship (%adeq./very adeq.)		52.2	50.8	53.3	48.9	56.0	50.3	51.1	56.2	62.1	46.9
#9 Leisure Time (%adeq./very adeq.)		49.7	47.0	52.0	48.3	55.1	46.8	49.3	50.4	40.0	50.8
#10 Appreciate Culture (%adeq./very adeq.)		43.1	41.5	44.5	48.3	54.7	35.9	34.3	50.9	62.0	51.6
#11 Management Skills (%adeq./very adeq.)		39.1	35.2	42.7	48.3	42.4	36.3	31.8	52.2	48.0	37.5
#12 World of Work (%adeq./very adeq.)		38.0	30.7	44.5	48.3	38.2	36.8	34.7	50.9	32.0	31.7

[1]Sex: "M" - male, "F" - female
[2]Achievement: "L" - low, "M" - medium, "H" - high
[3]Plans: "UNIV" - university, "COLL" - college, "WORK" - work after high school, "OTHR" - other plans

TABLE 15

GENERAL QUALITY INDICATORS: STUDENTS ENROLLED IN THE GENERAL PROGRAM
IN ASSOCIATION WITH SELECTED STUDENT CHARACTERISTICS

Indicators		Norm	Sex[1]		Achievement[2]			Plans[3]			
			M	F	L	M	H	UNIV	COLL	WORK	OTHR
Internal:	N=	(862)	(514)	(348)	(533)	(263)	(66)	(63)	(159)	(193)	(151)
Percent achieving high school diploma		35.5	33.3	38.8	31.3	40.3	50.0	60.3	54.7	37.8	41.7
Percent achieving matriculation status		3.7	2.5	5.5	0.4	4.6	27.3	25.4	2.5	0.0	4.6
Average high school mark		55.4	53.8	57.8	54.3	56.0	62.2	60.2	57.8	56.0	57.6
External:	N=	(148)	(85)	(63)	(86)	(46)	(16)	(10)	(39)	(34)	(27)
Average years of further education		1.0	1.2	0.7	0.8	1.2	1.6	1.9	1.3	1.0	0.8
Percent unemployed and seeking a job		10.2	8.9	12.1	10.0	7.0	21.4	11.1	13.9	6.3	3.8
Average Pineo-Porter job status level		41.1	37.7	48.1	39.0	43.2	46.8	51.0	43.7	40.7	38.6
Percentage earning over $12,000		30.0	41.0	10.6	34.7	24.4	21.4	11.1	31.3	32.3	44.0
Percent satisfied/very satisfied with career		60.8	52.9	71.4	65.1	60.9	37.5	60.0	56.4	67.6	66.7
Overall goal rating (%adeq./very adeq.)		54.5	53.0	56.7	55.7	54.2	49.8	57.5	60.4	49.8	58.8
#1 Basic Competencies (%adeq./very adeq.)		65.7	63.2	68.9	64.8	68.4	62.5	80.0	75.6	64.3	62.5
#2 Use Information (%adeq./very adeq.)		58.5	61.5	54.5	58.5	63.3	43.7	55.0	67.1	57.1	58.9
#3 Communication Skills (%adeq./very adeq.)		63.4	58.5	70.2	65.5	62.1	55.3	50.0	65.3	64.3	66.6
#4 Health, Fitness, Safety (%adeq./very adeq.)		60.5	59.5	61.6	64.5	56.6	50.0	66.7	68.8	57.2	66.6
#5 Respect Others (%adeq./very adeq.)		56.2	54.0	59.1	57.9	49.0	68.7	60.0	53.7	40.0	66.1
#6 Desire Learning (%adeq./very adeq.)		50.7	48.8	53.0	50.0	55.0	45.0	58.3	65.6	38.1	60.7
#7 Understand Changes (%adeq./very adeq.)		53.9	56.9	50.0	54.0	56.1	46.9	60.0	65.8	50.0	50.0
#8 Good Citizenship (%adeq./very adeq.)		56.5	58.5	53.8	61.4	53.1	39.6	35.0	63.0	52.4	66.7
#9 Leisure Time (%adeq./very adeq.)		53.6	49.4	59.1	54.5	51.0	56.2	70.0	56.1	42.8	71.4
#10 Appreciate Culture (%adeq./very adeq.)		48.0	46.5	50.0	46.0	46.9	62.5	45.0	56.1	47.1	51.8
#11 Management Skills (%adeq./very adeq.)		54.2	50.6	59.1	57.9	53.1	37.5	70.0	56.1	51.4	60.7
#12 World of Work (%adeq./very adeq.)		39.2	32.2	48.5	39.8	40.8	31.2	40.0	41.5	40.0	32.1

[1]Sex: "M" - male, "F" - female
[2]Achievement: "L" - low, "M" - medium, "H" - high
[3]Plans: "UNIV" - university, "COLL" - college, "WORK" - work after high school, "OTHR" - other plans

in the Business program (11%) and in the Vocational program (9%). The difference between male and females was only 5% in the Matriculation and General programs.

In relation to the percentage achieving matriculation status, the difference between the sexes was virtually non-existent for those in the Matriculation program (Table 14). In the cases of both the Vocational and Business programs, a higher percentage of males (approximately 2.5%) than of females achieved matriculation status. The reverse was found for students enrolled in the General program.

The average marks achieved were three to four percentage points higher for the females, irrespective of program.

Internal indicators: previous achievement. There was almost no relationship between prior achievement and the percentage achieving a high school diploma for students in either the Vocational or Business programs. The higher percentage shown in the case of the high prior achievement group within the Business program may have its source in the small numbers involved. The relationship was much more evident in the cases of both the General and Matriculation programs where the percentage increases approximately 10 points from the low to medium and from the medium to high prior achievement groups.

Since the overall percentage of Business students attaining matriculation status was small, further breakdown on the basis of prior achievement was deemed to be of questionable value. In the cases of the remaining three programs (Vocational, Matriculation, and General) the increase in the percentage of students achieving matriculation status was very large as one moves from the low, to the medium, to the high achievement groups. The increase found was much

larger in these cases than for the above-mentioned indicator of the percentage achieving a high school diploma.

The average marks achieved showed a consistent relationship with the prior achievement variable over all four programs. The increase was greater between the medium and high achievement groups than between the low and medium groups for all four programs.

Internal indicators: career plans. The relationship between the percentage achieving a high school diploma and the career plans of the student displays considerable similarity over the four programs. However, two important differences between programs may be noted in the comparison of the results presented in Tables 12 through 15. For the General and Matriculation programs, a higher percentage of students with "other" career plans than students with "work" as a career plan, achieved a high school diploma; the converse was found in the Business program, and in the Vocational program there was no difference between the two career plan categories. No difference in the percentage achieving a high school diploma was found between the university and college bound student taking a Vocational program, while higher percentages of university bound students achieved a diploma in both the General and Matriculation programs.

Comparisons between the four career plan groups yield similar patterns in the case of the percentage of students achieving matriculation status.

Similarily, in relation to the average marks achieved, the relationship with career plans was generally the same from program to program.

External indicators: sex of the respondent. In relation to the various career achievement and goal rating variables, Tables 12 through 15 display the following important differences among the four programs when examining the variable of sex.

1. The percentage unemployed was reported higher for female than for males from the General program (12% versus 9%), while slightly higher unemployment was reported for males (a difference of .5%) from the Matriculation program.
2. In the case of the indicator "career satisfaction", the percentage of females reporting either satisfied or very satisfied was much higher than for males (71% versus 53%) among the General program graduates. This indicator shows the reverse for graduates from the Matriculation program with males slightly higher than females (67% versus 65%).
3. The differences between males and females on the ratings of the adequacy of the various goals were similar for the four programs.

External indicators: prior achievement. In examining the pattern of achievements (as represented by the various external indicators) by the low, medium, and high prior achievement groups within each program, the following comparisons stand out.

1. In the case of the Business graduate, prior achievement appears to be not related to the years of further education, as is the case with the graduates from the other three programs.
2. The percentage unemployed is highest for the high achievement group and lowest for the medium achievement group within both the Matriculation and General programs. Comparisons with the Business and Vocational programs are not possible due to the zero

unemployment reported from graduates of these programs.

3. The percentage earning over $12,000 per year indicates a positive relationship with prior achievement in the case of the Business and Vocational programs, but a negative relationship in the General program. From the Matriculation program, the low achievement group shows the highest percentage earning over $12,000.
4. In relation to career satisfaction, the high prior achiever from the General program reports much lower career satisfaction on the average than was found for graduates of the other three programs.
5. In comparing goal ratings for the three prior achievement groups, similarities exist within each of the four programs in that the medium group rates the overall goal achievement higher in the Matriculation, Business, and Vocational programs whereas the low achievement group rates the goals highest in the General program.

External indicators: career plans. The relationship between career plans and the external indicators appears to differ significantly from program to program in the following instances.

1. Within the General program, the percentage reporting the status of unemployed and seeking a job was highest for those who had plans to attend college and lowest with "other" career plans. Within the Matriculation program, the reported unemployment rate was highest for those with "other" career plans and lowest for those who had planned to attend university.
2. Within the General program, the percentage earning over $12,000 was highest for students with "other" career plans and lowest for those with plans to attend university, whereas within the

Matriculation program the highest was for those who had planned to attend university.

3. In relation to career satisfaction, the highest measure was found for those who had planned either college or university within the Matriculation program, whereas within the General program the highest measure was found for those who did not plan either college or university.
4. Overall goal ratings were highest for students in the Business program who had planned to go to work, in the Vocational program for those who had planned to attend college, and lowest for those in the General program who had planned on going directly to work.

Summary

The disaggregation of selected general quality indicators of quality education based on the student variables most closely associated with variance in these indicators has been presented in this chapter. The findings presented revealed the differences between male and female achievements with females scoring higher on most indicators. The extent of the difference among the three groups of students categorized on prior achievement were also identified, with differences of up to 20 percentage points found in favor of the high prior achievement group. The reported unemployment rate was an exception, with the high prior achievement group showing the highest unemployment rate. The nature of the association of the student career plans with the various indicators of quality education was also portrayed.

Disaggregations based on student program revealed notably higher percentages of students in the Business and Vocational programs

achieving a high school diploma than was the case for the General program although other variables, such as prior achievement, were very similar for the three programs. Average high school marks were also higher for the Business and Vocational programs compared to the General program. Unemployment rates were reported as zero for both the Business and Vocational programs and graduates of the Vocational program had the highest percentage reporting a wage of over $12,000 per year.

The levels reported on the quality indicators for groups categorized by student characteristics within each of the student programs revealed further differences. The male/female differences were found to be more pronounced in some areas and even reversed in others, depending upon the program that the student was enrolled in. Prior achievement was not found to be a factor in the completion rates for a high school diploma in either the Vocational or Business programs. The average marks however showed a consistent relationship over the four programs.

Subject Area Quality Indicators Disaggregated According to Student Characteristics

This section continues the report of the findings in reference to sub-problem five, focusing on the subject area quality indicators and the differences for various groups of students based on student characteristics.

Quality indicators selected with reference to subject areas included two types of internal indicators and the external rating of

subject area goals by students after they had left school. Due to the low numbers, further disaggregation of the external indicators by the various student characteristics was not undertaken. The internal indicators, measures of the extent to which each subject area was providing instruction to students and measures of the level of achievement by students within the subject area, were disaggregated based on the student characteristics found associated with variance in the indicators. The results of these disaggregations follow, and present some indication of the way that each subject area has provided for students of varying characteristics.

English Subject Area

The calculations of the selected indicators for the various sub-groups of students in both the Matriculation English and General English subject areas are presented in Table 16.

Sex of student. Slightly higher percentages of females than of males took at least one Matriculation English course, and of those that did, females averaged slightly more credits than did males. The converse was the case for the General English subject area. Females, on the average, achieved marks 6% to 7% higher than males in both General and Matriculation English. The percentage of females achieving grades of A or B was 6 points higher than for males in the Matriculation route and 7 points higher in the General route. An examination of those receiving grades of D or F shows an even wider spread (12% in the Matriculation and 15% in the General). Marks also show a wide advantage to females, more so in the General than in the

TABLE 16

ENGLISH SUBJECT AREA QUALITY INDICATORS DISAGGREGATED ACCORDING TO SELECTED STUDENT CHARACTERISTICS

Indicators	Norm	Sex[1]		Achievement[2]			Plans[3]			
		M	F	L	M	H	UNIV	COLL	WORK	OTHR
MATRICULATION ENGLISH										
Internal:	N= (2266)	(1135)	(1131)	(533)	(858)	(875)	(687)	(493)	(307)	(381)
Average credits per student	11.4	10.7	12.2	4.8	12.7	17.1	17.2	12.1	6.2	11.5
Percentage of students taking 1+ courses	82.3	80.8	83.9	56.9	91.7	99.3	99.3	84.4	62.8	85.4
Average # of courses (by those taking)	3.1	3.0	3.1	2.0	3.1	3.6	3.7	3.1	2.2	3.0
Average mark (by those taking)	60.6	57.2	63.9	51.4	57.8	68.9	66.3	59.9	55.8	60.2
Percentage of A's and B's	44.6	34.1	54.7	13.0	29.7	67.8	57.6	39.4	26.0	43.4
Percentage of D's and F's	16.2	22.5	10.1	38.6	20.0	5.3	10.1	16.9	26.0	16.2
GENERAL ENGLISH										
Internal:	N= (1861)	(986)	(875)	(833)	(615)	(413)	(332)	(406)	(416)	(328)
Average credits per student	5.6	5.8	5.5	9.4	4.8	2.5	2.7	6.1	9.4	6.3
Percentage of students taking 1+ courses	67.6	70.2	64.9	89.0	65.7	46.9	48.0	69.5	85.1	73.5
Average # of courses (by those taking)	1.8	1.9	1.8	2.3	1.6	1.2	1.2	1.9	2.4	1.9
Average mark (by those taking)	61.8	58.3	65.8	57.5	62.6	69.4	67.6	62.7	59.5	62.6
Percentage of A's and B's	40.2	27.9	54.5	29.0	48.4	68.4	58.0	43.9	32.9	42.3
Percentage of D's and F's	17.1	24.1	8.9	22.2	11.9	6.9	9.8	13.3	19.2	14.0

[1]Sex: "M" - male, "F" - female
[2]Achievement: "L" - low, "M" - medium, "H" - high
[3]Plans: "UNIV" - university, "COLL" - college, "WORK" - work after high school, "OTHR" - other plans

Matriculation program.

Prior achievement. When prior achievement is considered, a positive relationship is evident with the number of Matriculation English credits taken. The reverse was true concerning the relationship between prior achievement and the number of credits in General English. For the Matriculation English route, 38% of the low prior achievement group and 20% of the middle achivement group were assigned D and F grades, whereas only 5% of the high achievement group attained these low grades. The low and middle prior achievement groups fared more favorably in General English with respective figures shown being 22%, 12%.

Career plans. When the indicators are examined for the sub-groupings based on student career plans, the general trends evident in Table 16 show proportionate decreases in the percentage of students enrolled, and the achievement levels of those enrolled, as one moves from university to college, to work bound students. In General English, the reverse trend was found to be the case. Those in the "other" category show levels comparable to the college group in both General and Matriculation routes.

The General English program appears not only to attract the enrollments from the lower achievement groups and the work bound student, but also evidence is given that these types of students achieve better in this program than in the Matriculation program. To some degree at least the two programs complement each other in providing English instruction to the whole student body.

Social Studies and Social Science Subject Areas

Table 17 presents the internal indicators for the Social Studies and Social Science program, disaggregated by the student variables selected.

Sex of student. Little difference is evident between the sexes on the extent of participation in these courses. Achievement indicators however show females receiving higher grades than males in both subject areas, with the average mark 3% higher in Social Studies and 7% higher in Social Science. The differences found for the percentage achieving either an A or B was also considerable, especially in Social Sciences where 28% of the males compared with 53% of the females received these high grades. The differences between males and females were also greater in the Social Science subject area, when comparing the percentage of students achieving grades of either a D or F.

Prior achievement. Students from all three levels of previous achievement tend to take at least one Social Studies course, while the high achievement group take more credits than the lower groups. The Social Science courses were taken more often by the lower prior achievers, with 69% of the low achievement group taking at least one course, and each of these taking 1.8 such courses on the average. Similar to the English subject area, students from the lower previous achievement groups do achieve better in Social Science, where more of them are enrolled, although higher percentages (6% more) of the low group received grades of D or F in these "General" courses than in the corresponding General English.

TABLE 17

SOCIAL STUDIES AND SOCIAL SCIENCE SUBJECT AREA QUALITY INDICATORS DISAGGREGATED ACCORDING TO SELECTED STUDENT CHARACTERISTICS

Indicators	Norm	Sex[1]		Achievement[2]			Plans[3]			
		M	F	L	M	H	UNIV	COLL	WORK	OTHR
SOCIAL STUDIES										
Internal:	N= (2727)	(1388)	(1339)	(913)	(934)	(880)	(692)	(584)	(486)	(443)
Average credits per student	10.4	10.2	10.6	7.1	10.9	13.2	13.5	10.8	7.5	10.7
Percentage of students taking 1+ courses	99.1	98.8	99.3	97.5	99.8	99.9	100	100	99.4	99.3
Average # of courses (by those taking)	2.3	2.2	2.3	1.7	2.4	2.7	2.9	2.3	1.6	2.3
Average mark (by those taking)	59.7	58.1	61.3	52.0	57.9	69.6	67.3	59.1	55.3	59.4
Percentage of A's and B's	38.7	35.1	42.2	12.7	26.6	66.4	56.3	32.7	20.9	35.0
Percentage of D's and F's	20.3	23.9	16.5	42.7	21.3	5.0	9.8	21.7	33.4	19.7
SOCIAL SCIENCE										
Internal:	N= (1493)	(734)	(759)	(645)	(514)	(334)	(276)	(357)	(367)	(262)
Average credits per student	3.7	3.6	3.8	5.4	3.6	2.0	2.2	4.4	5.7	4.2
Percentage of students taking 1+ courses	54.2	52.2	56.3	68.9	54.9	37.9	39.9	61.1	75.1	58.7
Average # of courses (by those taking)	1.6	1.6	1.6	1.8	1.6	1.3	1.3	1.7	1.8	1.7
Average mark (by those taking)	61.1	57.3	64.9	55.5	61.4	71.6	69.4	62.0	57.5	61.0
Percentage of A's and B's	40.6	28.4	52.9	25.6	43.9	76.2	66.1	43.7	30.4	39.5
Percentage of D's and F's	20.3	28.0	12.7	28.4	15.8	6.7	8.4	16.1	26.4	21.4

[1]Sex: "M" - male, "F" - female
[2]Achievement: "L" - low, "M" - medium, "H" - high
[3]Plans: "UNIV" - university, "COLL" - college, "WORK" - work after high school, "OTHR" - other plans

Career plans. Once again, when focusing on student career plans, the results in the Social Studies and Social Science subject areas are similar to those shown in English, except that the Social Studies area serves to a limited extent all students irrespective of their career plans. In Social Science however, 75% of work bound students enroll in one or more courses, in comparison with only 40% of the university bound students. Achievement levels are also lowest for the work bound student in both areas.

Mathematics Subject Area

Sex of student. Both Mathematics routes appear to provide instruction to equal numbers of males and females, as shown in Table 18. Also, while the achievement indicators for females are higher than for males, the differences are less than those noted earlier for English or Social Studies.

Prior achievement. Twenty-five percent of the low achievement group, 77% of the middle group and 98% of the high achievement group took one or more Matriculation Mathematics courses. A similar relationship in the reverse direction was found for the General Mathematics courses. Higher percentages of the lower achievement groups received D's and F's in both programs than in any of the other subject areas. Based on these figures, the General Mathematics program particularly would appear to be not meeting the needs of the poorer student as well as the English and Social programs.

Career plans. The Matriculation program serves 96% of the university bound student group and only 36% of the students planning

TABLE 18

MATHEMATICS SUBJECT AREA QUALITY INDICATORS DISAGGREGATED ACCORDING TO SELECTED STUDENT CHARACTERISTICS

Indicators	Norm	Sex[1]		Achievement[2]			Plans[3]			
		M	F	L	M	H	UNIV	COLL	WORK	OTHR
MATRICULATION MATHEMATICS										
Internal:	N= (1814)	(936)	(878)	(230)	(722)	(862)	(668)	(409)	(175)	(297)
Average credits per student	8.1	8.4	7.8	1.9	8.2	14.5	14.5	7.8	3.1	7.9
Percentage of students taking 1+ courses	65.9	66.6	65.1	24.6	77.1	97.8	96.5	70.0	35.8	66.6
Average # of courses (by those taking)	2.8	2.9	2.7	2.1	2.6	3.1	3.3	2.6	2.0	2.7
Average mark (by those taking)	59.4	58.2	60.7	47.7	53.8	67.2	64.8	56.7	53.5	58.5
Percentage of A's and B's	41.0	38.6	43.7	12.7	22.7	59.0	50.9	32.7	24.4	36.1
Percentage of D's and F's	19.1	21.1	16.6	45.3	28.3	7.7	12.0	24.1	29.4	20.2
GENERAL MATHEMATICS										
Internal:	N= (1396)	(730)	(666)	(825)	(469)	(102)	(124)	(314)	(389)	(224)
Average credits per student	3.9	4.4	3.5	6.8	4.0	0.8	1.3	4.5	6.3	4.0
Percentage of students taking 1+ courses	50.7	52.0	49.4	88.1	50.1	11.6	17.9	53.8	79.6	40.3
Average # of courses (by those taking)	1.7	1.9	1.5	1.7	1.7	1.4	1.7	1.8	1.8	1.8
Average mark (by those taking)	59.4	57.3	61.6	56.4	62.5	68.8	62.9	60.9	59.6	61.0
Percentage of A's and B's	35.2	30.6	41.6	27.4	44.2	61.2	42.5	36.8	35.1	37.5
Percentage of D's and F's	25.9	29.3	21.2	31.4	18.8	11.6	18.5	24.4	26.4	24.7

[1]Sex: "M" - male, "F" - female
[2]Achievement: "L" - low, "M" - medium, "H" - high
[3]Plans: "UNIV" - university, "COLL" - college, "WORK" - work after high school, "OTHR" - other plans

on going directly to work. Only 18% of those with university plans and 80% of those planning on entering work directly after high school took General Mathematics courses. Over 25% of those work bound received failing grades. The college bound student and those in the "other" category fell approximately half-way between the university and work groups on all indicators.

Science Subject Area

Sex of student. The Matriculation Science subject area is the only Matriculation program enrolling higher percentages of males than females, as shown in Table 19. Both sexes were about equally represented in the General Science courses. Once again the females received higher marks, especially so in the General program where the difference between average marks was 5%; also 15% more females received A's and B's, and 10% more males received grades of D and F.

Prior achievement. Fifty percent of the low prior achievement group and very high percentages of the remainder of the students took at least one course from the Matriculation Science subject area, with the high achievement group averaging 22 credits per student, the highest of all subject areas. This can be compared with averages of 17 and 14.5 credits for the Matriculation English and Mathematics subject areas respectively. The General Science set of courses provided instruction for 78% of the low achievement group but a smaller percentage of the middle and high achievement groups than, for example, the General Mathematics courses. Previous achievement again is associated with marks in Science, with 43% of the low achievement

TABLE 19

SCIENCE SUBJECT AREA QUALITY INDICATORS DISAGGREGATED ACCORDING TO SELECTED STUDENT CHARACTERISTICS

Indicators	Norm	Sex[1]		Achievement[2]			Plans[3]			
		M	F	L	M	H	UNIV	COLL	WORK	OTHR
MATRICULATION SCIENCE										
Internal:	N= (2176)	(1162)	(1014)	(471)	(832)	(873)	(688)	(494)	(265)	(368)
Average credits per student	13.1	13.7	12.5	4.3	13.7	22.0	22.4	13.3	5.2	13.1
Percentage of students taking 1+ courses	79.0	82.7	75.2	50.3	88.9	99.1	99.4	84.6	54.2	82.5
Average # of courses (by those taking)	5.3	5.4	5.3	3.2	5.3	6.5	6.8	5.1	3.5	5.1
Average mark (by those taking)	58.8	57.5	60.3	49.1	55.2	67.5	65.5	57.3	52.8	57.9
Percentage of A's and B's	39.6	37.8	41.7	11.7	22.2	60.5	52.4	31.3	18.4	36.4
Percentage of D's and F's	18.6	20.7	16.2	42.7	25.8	6.7	10.5	21.8	34.8	20.3
GENERAL SCIENCE										
Internal:	N= (1025)	(535)	(490)	(731)	(251)	(43)	(67)	(207)	(338)	(162)
Average credits per student	1.9	2.0	1.8	3.9	1.4	0.2	0.5	1.9	3.5	1.9
Percentage of students taking 1+ courses	37.2	38.1	36.4	78.1	26.8	4.9	9.7	35.4	69.1	36.4
Average # of courses (by those taking)	1.1	1.1	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Average mark (by those taking)	59.3	56.9	61.9	58.2	61.7	63.4	64.1	60.8	59.3	60.5
Percentage of A's and B's	32.4	25.8	40.4	28.1	40.5	56.3	52.1	34.9	31.3	34.8
Percentage of D's and F's	22.6	27.0	17.2	25.4	15.0	18.7	15.5	18.6	22.7	17.7

[1]Sex: "M" - male, "F" - female
[2]Achievement: "L" - low, "M" - medium, "H" - high
[3]Plans: "UNIV" - university, "COLL" - college, "WORK" - work after high school, "OTHR" - other plans

group receiving grades of D or F in the Matriculation route and 25% doing so in the General route. Nearly the same percentages of the high previous achievement group received A's and B's (68%) in Matriculation Science as in the other matriculation subject areas.

Career plans. Very similar patterns to that of Mathematics for the involvement and achievement indicators are evident in the various groups identified by career plans. That is, the Matriculation courses provided instruction to very high percentages of students with plans of going to university, but also to approximately 35% of those planning on going directly into work after high school. The General Science courses provided instuction to 70% of those planning on work and 35% of those planning college after high school.

Second Languages Subject Area

The Second Languages subject area combines several different language programs having the same subject area objectives.

Sex of student. Table 20 shows 12% more of the females than of males registered in these courses, with an average mark nearly 7% higher. Ten percent more males received D's and F's than females and 16% more females than males received marks of A or B.

Prior achievement. Once again higher percentages of the higher achievement groups were enrolled in these courses and the higher achievement groups had taken more courses, and completed more credits. The average mark for the high achievement group was 10% higher than for both the middle and low groups whose average achievement was about equal. However, 27% of the low achievement group received grades of D

TABLE 20

SECOND LANGUAGES SUBJECT AREA QUALITY INDICATORS DISAGGREGATED ACCORDING TO SELECTED STUDENT CHARACTERISTICS

Indicators	Norm	Sex[1]		Achievement[2]			Plans[3]			
		M	F	L	M	H	UNIV	COLL	WORK	OTHR
Internal:	N= (1519)	(695)	(824)	(201)	(536)	(782)	(597)	(317)	(138)	(241)
Average credits per student	5.6	4.5	6.8	1.7	5.3	10.1	9.6	5.4	2.4	5.6
Percentage of students taking 1+ courses	55.2	49.5	61.1	21.5	57.3	88.8	86.3	54.3	28.2	54.0
Average # of courses (by those taking)	2.2	2.0	2.3	1.7	2.0	2.4	2.4	2.1	1.8	2.2
Average mark (by those taking)	63.1	59.5	66.2	57.3	58.9	67.5	64.9	62.8	61.6	63.6
Percentage of A's and B's	51.1	41.8	57.7	36.0	37.3	61.9	55.7	51.7	44.5	50.7
Percentage of D's and F's	14.3	20.6	9.7	26.8	20.3	8.5	12.2	14.0	17.7	13.8

[1]Sex: "M" - male, "F" - female
[2]Achievement: "L" - low, "M" - medium, "H" - high
[3]Plans: "UNIV" - university, "COLL" - college, "WORK" - work after high school, "OTHR" - other plans

or F, in comparison to 20% for the medium group and 8.5% for the high group.

Fine Arts Subject Areas

Sex of student. The figures in Table 21 reveal almost equal enrollments by males and females in the Art courses, whereas Drama and Music had higher percentages of females. For all three of these subject areas, the average number of courses taken by those of both sexes who were enrolled was about the same. The males in Art, however, received lower grades than their male counterparts in Drama and Music, with 20%, 12%, and 4% of the males receiving grades of D or F respectively. The average Music mark was high as reported earlier in this chapter, with 80% of the males and 90% of the females receiving a mark of either A or B. The difference between males and females on the achievement indicators was greatest in Art, where 44% of the males, compared with 65% of the females, received grades of A or B; and 20% of males, compared with 8% of females, received grades of D or F.

Prior achievement. Nearly equal percentages of low and medium achievement students enrolled in Art courses with slightly lower percentages from the high achievement group. Differences in Drama were less pronounced. The distribution of numbers enrolled in the three subject areas reveals higher percentages for the high prior achievement group in Music than in either Art or Drama. In all three subject areas and for all three prior achievement groups the average mark increases as one moves from Art, to Drama, to Music. Overall,

TABLE 21

FINE ARTS SUBJECT AREA QUALITY INDICATORS DISAGGREGATED ACCORDING TO SELECTED STUDENT CHARACTERISTICS

Indicators		Norm	-----Sex[1]---- M	F	----Achievement[2]---- L	M	H	----------Plans[3]---------- UNIV	COLL	WORK	OTHR
ART											
Internal:	N=	(575)	(282)	(293)	(224)	(211)	(140)	(100)	(133)	(111)	(116)
Average credits per student		1.4	1.3	1.5	1.5	1.6	1.2	1.1	1.7	1.3	1.9
Percentage of students taking 1+ courses		20.9	20.1	21.7	23.9	22.5	15.9	14.5	22.8	22.7	26.0
Average # of courses (by those taking)		1.6	1.5	1.6	1.5	1.6	1.6	1.6	1.7	1.4	1.6
Average mark (by those taking)		62.7	59.1	66.1	59.0	62.3	69.1	67.2	64.1	61.1	64.0
Percentage of A's and B's		54.4	43.6	64.5	44.5	52.5	71.8	64.8	59.6	43.2	60.3
Percentage of D's and F's		13.8	20.4	7.8	20.1	13.8	4.9	8.0	10.7	17.0	10.1
DRAMA											
Internal:	N=	(359)	(164)	(195)	(138)	(120)	(101)	(81)	(79)	(63)	(66)
Average credits per student		0.8	0.7	0.9	0.9	0.8	0.8	0.9	0.8	0.6	1.0
Percentage of students taking 1+ courses		13.0	11.7	14.5	14.7	12.8	11.5	11.7	13.5	12.9	14.8
Average # of courses (by those taking)		1.5	1.5	1.4	1.4	1.4	1.5	1.6	1.4	1.2	1.6
Average mark (by those taking)		66.5	63.8	68.7	63.3	66.1	71.3	72.5	67.2	63.2	66.5
Percentage of A's and B's		61.4	54.0	67.7	50.8	59.8	77.4	77.9	64.6	51.3	59.6
Percentage of D's and F's		7.9	11.7	4.6	10.2	7.4	5.3	2.4	4.4	12.2	9.6
MUSIC											
Internal:	N=	(311)	(135)	(176)	(72)	(111)	(128)	(111)	(66)	(39)	(45)
Average credits per student		1.0	0.9	1.1	0.6	1.0	1.5	1.7	1.0	0.6	0.8
Percentage of students taking 1+ courses		11.3	9.6	13.1	7.7	11.9	14.5	16.0	11.3	8.0	10.1
Average # of courses (by those taking)		1.9	2.0	1.9	1.7	1.8	2.2	2.2	2.0	1.8	1.7
Average mark (by those taking)		73.3	71.7	74.6	67.3	72.6	77.3	75.9	73.4	70.0	71.6
Percentage of A's and B's		84.7	79.2	89.2	68.1	83.3	92.6	90.5	87.6	77.2	82.1
Percentage of D's and F's		2.8	3.7	2.1	5.9	3.0	1.4	0.8	2.3	5.7	3.9

[1]Sex: "M" - male, "F" - female
[2]Achievement: "L" - low, "M" - medium, "H" - high
[3]Plans: "UNIV" - university, "COLL" - college, "WORK" - work after high school, "OTHR" - other plans

13.8% of the Art students received D's or F's, while comparative figures for Drama and Music were 7.9 and 2.8 respectively.

Career plans. Both Art and Drama provided instruction to higher percentages of students with college, work, and "other" post high school plans than to students planning to go to university. The reverse was true for the Music program. The achievement indicators (average marks and grade distributions) however follow the same pattern as for the subject areas discussed previously, with the university bound student highest, the student planning work lowest, and the college and other student in the middle.

Physical Education Subject Area

Sex of student. When the results presented in Table 22 are compared with those for the other courses mentioned thus far, it is evident that Physical Education is the only subject area having both approximately equal participation levels and approximately equal achievement levels for males and females.

Prior achievement and career plans. Participation levels are also almost equal for all three prior achievement groups and for all four categories of students, based on career plans. Achievement patterns evident for most of the other subject areas are repeated here, with the high prior achievers having the highest average marks, and more of the university bound students (70%) achieving A's and B's whereas a smaller percentage of the students who planned to enter work (51%) achieved these grades. For D's and F's the percentage was lowest for the university bound and highest for those aspiring to work

TABLE 22

PHYSICAL EDUCATION SUBJECT AREA QUALITY INDICATORS DISAGGREGATED ACCORDING TO SELECTED STUDENT CHARACTERISTICS

Indicators	Norm	Sex[1]		Achievement[2]			Plans[3]			
		M	F	L	M	H	UNIV	COLL	WORK	OTHR
Internal:	N= (2683)	(1368)	(1315)	(895)	(916)	(872)	(685)	(575)	(473)	(438)
Average credits per student	6.0	6.4	5.5	5.8	6.1	6.0	6.6	6.0	5.7	6.1
Percentage of students taking 1+ courses	97.5	97.4	97.6	95.6	97.9	99.0	99.0	98.5	96.7	98.2
Average # of courses (by those taking)	1.4	1.5	1.3	1.5	1.4	1.4	1.5	1.5	1.4	1.5
Average mark (by those taking)	65.1	64.8	65.5	61.6	65.1	68.8	68.8	66.6	63.5	65.6
Percentage of A's and B's	57.8	57.0	58.8	46.7	57.7	70.3	70.1	60.7	50.8	57.8
Percentage of D's and F's	8.1	8.7	7.4	12.9	7.6	3.4	3.4	6.2	9.8	7.1

[1]Sex: "M" - male, "F" - female
[2]Achievement: "L" - low, "M" - medium, "H" - high
[3]Plans: "UNIV" - university, "COLL" - college, "WORK" - work after high school, "OTHR" - other plans

on leaving high school.

Business Education Subject Area

Sex of student. As evident from a perusal of Table 23, 92% of all females took at least one course in Business Education, whereas the comparable figure for the males was 77%. The females also averaged nearly 3.9 courses in the subject area for an average of 16 credits, while the corresponding figures for the males were 2.2 courses and almost 6.9 credits. The average mark received by females was six percent higher than that for males with 15% more females than males receiving grades of A or B. Twice as many males as females were given grades of D or F.

Prior achievement. The percentage of students taking one or more courses was over 80% for all three levels of previous achievement; however the low achievement group enrolled in more courses and achieved more credits than the high achievement group. Achievement levels in Business Education increased progressively from an average mark of 57% for the low prior achievement students, to 63% for the middle group, and 70% for the high group.

Career plans. Over 80% of students in each of the four career plan alternatives had enrolled in one or more courses. Students who planned to enter the work force directly following high school completed more courses and earned more high school credits (18 on the average), whereas college bound and "other" students each earned about 12 credits and the university bound students less than 7 credits on the average. Students who had planned to go to university received

TABLE 23

BUSINESS EDUCATION SUBJECT AREA QUALITY INDICATORS DISAGGREGATED ACCORDING TO SELECTED STUDENT CHARACTERISTICS

Indicators	Norm	Sex[1]		Achievement[2]			Plans[3]			
		M	F	L	M	H	UNIV	COLL	WORK	OTHR
Internal:	N= (2319)	(1082)	(1237)	(807)	(792)	(720)	(566)	(505)	(429)	(390)
Average credits per student	11.4	6.9	16.1	15.5	11.3	7.2	6.8	13.2	18.1	11.6
Percentage of students taking 1+ courses	84.2	77.0	91.8	86.2	84.6	81.7	81.8	86.5	87.7	87.4
Average # of courses (by those taking)	3.1	2.2	3.9	4.2	3.1	2.0	1.9	3.4	4.7	3.1
Average mark (by those taking)	63.1	59.8	65.9	57.0	62.7	70.4	68.2	64.5	60.7	62.9
Percentage of A's and B's	48.6	38.5	53.5	37.0	52.5	70.2	64.2	52.2	44.4	45.9
Percentage of D's and F's	16.3	24.5	12.3	22.7	13.4	5.7	8.8	13.4	17.3	17.5

[1]Sex: "M" - male, "F" - female
[2]Achievement: "L" - low, "M" - medium, "H" - high
[3]Plans: "UNIV" - university, "COLL" - college, "WORK" - work after high school, "OTHR" - other plans

higher average marks than did those in the other three career aspiration groups. This last finding was similar to that for all other subject areas.

Home Economics and Industrial Education Subject Areas

Sex of student. Figures in Table 24 reveal that 50% of the females and 6% of the males were enrolled in the Home Economics subject area, while for Industrial Arts these percentages were reversed. Thirty-five percent of the males and 13% of females had taken at least one Vocational Education course. Achievement levels for each of the three areas again were highest for females. In Home Economics, 25% of the males received grades of D or F compared with 8% of the females. In Vocational Education, 76% of the females received A's or B's, compared with 48% of the males.

Prior achievement. All three programs had about 1/3 of the low achievement group and about 1/4 of the middle group taking at least one course. Twenty percent of the high achievement group were involved in Home Economics and Industrial Arts but fewer in the case of Vocational Education. The differences on average marks and grade distribution was less for Vocational Education than for either Industrial Arts or Home Economics when comparing one prior achievement group with the next.

Career plans. Equal percentages of those who planned to go to work immediately following high school were involved in each program although those in Vocational Education took more courses on the average. Differences in achievement levels among the groups based on

TABLE 24

HOME ECONOMICS, INDUSTRIAL ARTS, VOCATIONAL EDUCATION SUBJECT AREA QUALITY INDICATORS DISAGGREGATED ACCORDING TO SELECTED STUDENT CHARACTERISTICS

Indicators		Norm	Sex[1]		Achievement[2]			Plans[3]			
			M	F	L	M	H	UNIV	COLL	WORK	OTHR
HOME ECONOMICS											
Internal:	N=	(773)	(90)	(683)	(315)	(255)	(203)	(146)	(190)	(166)	(154)
Average credits per student		2.2	0.3	4.2	2.8	2.1	1.6	1.6	2.8	2.5	2.9
Percentage of students taking 1+ courses		28.1	6.4	50.7	33.7	27.2	23.0	21.1	32.5	33.9	34.5
Average # of courses (by those taking)		1.7	1.2	1.7	1.8	1.7	1.5	1.6	1.8	1.6	1.7
Average mark (by those taking)		67.7	57.1	69.1	63.3	66.5	76.1	74.2	69.6	65.3	67.4
Percentage of A's and B's		65.0	31.2	68.1	51.9	66.9	86.9	81.1	70.3	55.7	66.5
Percentage of D's and F's		9.0	24.8	7.6	12.8	8.4	2.6	6.0	5.2	9.6	6.7
INDUSTRIAL ARTS											
Internal:	N=	(720)	(661)	(59)	(313)	(217)	(190)	(146)	(153)	(160)	(121)
Average credits per student		2.1	3.9	0.2	2.8	1.9	1.6	1.5	2.2	3.0	2.1
Percentage of students taking 1+ courses		26.2	47.0	4.4	33.4	23.2	21.6	21.1	26.2	32.7	27.1
Average # of courses (by those taking)		1.7	1.8	1.1	1.8	1.7	1.5	1.5	1.8	1.9	1.7
Average mark (by those taking)		63.5	63.4	64.9	59.8	63.3	69.9	68.7	65.1	61.8	63.4
Percentage of A's and B's		48.4	47.9	57.6	37.4	47.7	71.6	67.6	51.5	39.7	48.3
Percentage of D's and F's		12.3	12.5	7.6	16.6	11.5	4.5	6.1	9.4	12.0	12.8
VOCATIONAL EDUCATION											
Internal:	N=	665	493	172	292	252	121	115	145	169	92
Average credits per student		4.4	6.9	1.8	6.4	5.0	1.7	1.8	4.7	8.8	3.2
Percentage of students taking 1+ courses		24.2	35.1	12.8	31.2	26.9	13.7	16.6	24.8	34.6	20.6
Average # of courses (by those taking)		2.2	2.4	1.6	2.4	2.2	1.7	1.6	2.3	2.7	1.9
Average mark (by those taking)		65.0	62.8	71.2	62.5	65.5	69.9	68.8	68.1	63.2	64.8
Percentage of A's and B's		53.4	47.9	76.2	46.7	58.0	64.0	63.6	62.7	47.8	49.7
Percentage of D's and F's		12.0	13.5	5.7	16.2	9.7	3.5	6.7	6.1	14.3	13.6

[1]Sex: "M" - male, "F" - female
[2]Achievement: "L" - low, "M" - medium, "H" - high
[3]Plans: "UNIV" - university, "COLL" - college, "WORK" - work after high school, "OTHR" - other plans

career plans was shown to be greatest in the case of Home Economics where 81% of the university bound students achieved either A or B. Average marks across the four groups were quite similar for both Industrial Arts and Vocational Education.

Summary

Quality indicators dealing with the extent of participation of students and the level of achievement by students within each subject area have been presented, comparing provincial norms with figures for groups of students categorized according to the selected student characteristics.

The extent to which the sex of the student was associated with achievement levels was found to be less in some subject areas than in others. Differences were also identified in the level of participation of students from the three prior achievement groups in the various subject areas and the extent to which each group reached various levels of achievement within each subject area. The different levels of participation and achievement were also identified for groupings of students based on their career plans.

Quality Indicators Disaggregated to Region, Districts and Schools

Sub-problem 6: to develop profiles for selected schools and districts using the various indicators of quality education.

The previous section has demonstrated in more detail the nature of the influence of the student based independent variables which had been demonstrated in Chapter 5 to be associated with variance in the quality indicators. Such information could be used to direct more in-depth evaluations which may determine reasons for the different

achievement levels by different student groups, and thereby identify areas where changes may be deemed desirable.

In this section the focus is shifted to regional, system and subsystem factors. Analysis of variance reported in Chapter 5 showed important associations between the variance in the quality indicators and school districts and to a greater extent schools. These variables were not included in the Multiple Classification Analyses due to the internal limitations of that procedure. Further, since school districts and schools represent the two major decision making levels in implementing provincial policies and curriculum, it was considered desirable that in a province-wide monitoring activity they should also be recipients of evaluative information specific to their sphere of influence. It was also considered important that where possible the information available would show the educational achievements for the programs offered relative to important student characteristics identified earlier.

The approach chosen for illustrative purposes was to select nine school districts and twelve schools as examples and to develop profiles for each on selected general and subject area indicators. The districts and schools are identified in the tables and text only by number, but were selected so as to represent a variety of systems and schools as well as each region within the province. The discussion that is presented with these profiles attempts to demonstrate the differences that exist from one system or subsystem to another, and to illustrate the type of information that could be available to schools and school districts to assist them in achieving an awareness of differences that exist between jurisdictions and to

allow comparisons with provincial norms. Analysis of variance had shown little or no predictability of indicators with the geographic region as a factor. Nevertheless, from a provincial monitoring perspective, profiles were also developed and presented as a check on possible regional desparities.

The discussion related to each set of the illustrative profiles for each quality indicator focuses on jurisdictions with the lowest and highest scores on the indicator and examines notable differences in patterns when comparisons are made with the provincial norms reported earlier.

Percent Achieving a High School Diploma

Provincial norms established earlier show that 65% of the students achieved a high school diploma. Disaggregations of the entire sample found a difference of 10 percentage points between males and females, 20 percentage points between each of the low, medium and high prior achievement groups, and 30 percentage points between students planning to work immediately following high school, and those planning on attending university.

Regional profiles shown in Table 25 reveal a low of 63.5% in Region #2 and a high of 69% in Region #3 of students achieving a diploma. The differences between males and females in the completion rates were lower than the norm for Region #1 and higher than the norm for Regions #5 and #6, the northern regions of the province. Region #5 shows achievements substantially higher than the provincial norms for college and university bound students. Achievement rates were

TABLE 25

PERCENT ACHIEVING A HIGH SCHOOL DIPLOMA DISAGGREGATED ACCORDING TO SELECTED STUDENT CHARACTERISTICS AND INSTITUTIONS

Institution	N	ALL	---Sex[1]---		--Achievement[2]--			--------Plans[3]--------			
			M	F	L	M	H	UNIV	COLL	WORK	OTHR
Provincial:	(2753)	65.1	59.9	70.5	44.4	65.5	86.7	86.7	71.7	56.0	65.5
Regions:											
Region #1	(580)	64.7	62.7	66.9	45.5	62.9	86.0	84.1	68.6	54.4	67.6
Region #2	(751)	63.5	58.6	68.5	35.3	64.2	84.9	86.5	66.4	46.9	62.5
Region #3	(332)	69.0	63.2	75.3	49.5	64.1	88.5	85.4	69.0	74.1	70.7
Region #4	(543)	64.6	58.5	70.9	49.0	64.4	85.9	86.6	77.6	58.4	60.8
Region #5	(256)	66.4	58.9	74.0	43.8	76.3	93.8	97.9	77.9	54.4	64.4
Region #6	(291)	65.6	56.9	73.4	46.4	69.1	87.1	88.3	70.6	51.9	72.7
Districts:											
District #1	(22)	63.6	50.0	75.0	50.0	71.4	80.0	83.3	50.0	66.7	66.7
District #2	(21)	38.1	36.4	40.0	12.5	55.6	50.0	100	50.0	0	71.4
District #3	(39)	66.7	58.3	80.0	50.0	83.3	72.7	66.7	77.8	66.7	40.0
District #4	(51)	78.4	63.6	89.7	50.0	78.9	90.9	100	60.0	83.3	70.0
District #5	(29)	55.2	43.8	69.2	50.0	44.4	75.0	100	50.0	45.5	60.0
District #6	(554)	64.1	60.4	67.9	33.1	64.2	85.1	86.5	68.1	44.1	67.0
District #7	(500)	65.0	62.8	67.7	44.2	63.8	85.6	84.2	69.1	57.1	65.1
District #8	(80)	62.5	62.2	62.8	51.5	57.1	89.5	83.3	63.6	38.5	81.8
District #9	(186)	62.4	54.9	69.5	40.8	62.7	89.3	88.7	63.4	51.9	45.8
Schools:											
School #1	(28)	75.0	69.2	80.0	70.0	80.0	75.0	100	85.7	33.3	80.0
School #2	(28)	78.6	68.8	91.7	50.0	75.0	91.7	100	66.7	71.4	100
School #3	(19)	63.2	50.0	85.7	57.1	42.9	100	100	50.0	50.0	100
School #4	(48)	58.3	50.0	72.2	44.4	50.0	91.7	100	66.7	41.2	50.0
School #5	(18)	61.1	50.0	75.0	41.7	100	100	83.3	42.9	0	100
School #6	(65)	78.5	72.7	84.4	37.5	75.0	89.2	92.9	50.0	100	50.0
School #7	(54)	31.5	30.6	33.3	22.6	38.9	60.0	75.0	40.0	28.6	57.1
School #8	(72)	73.6	79.3	69.8	50.0	73.0	87.0	85.7	100	83.3	75.0
School #9	(50)	54.0	50.0	57.1	25.0	70.6	76.9	88.9	64.3	50.0	40.0
School #10	(48)	60.4	60.0	61.1	53.8	62.5	83.3	88.9	75.0	50.0	50.0
School #11	(34)	47.1	50.0	45.0	26.7	66.7	57.1	50.0	85.7	0	33.3
School #12	(43)	69.8	75.9	57.1	25.0	75.0	82.6	88.9	50.0	33.3	40.0

[1]Sex: "M" - male, "F" - female
[2]Achievement: "L" - low, "M" - medium, "H" - high
[3]Plans: "UNIV" - university, "COLL" - college, "WORK" - work after high school, "OTHR" - other plans

5%-10% lower for college and work bound students in Region #2, while considerably higher percentages of students planning on work following high school in Region #3 achieved a high school diploma.

School Districts. Percentages of students achieving a diploma ranged from 38% to 78% in the nine school districts selected for illustrative purposes, as shown in Table 25. The difference between males and females was 25% for District #1, while for District #8 the completion rates for males and females were the same.

District #2 had the lowest percentage of students achieving a high school diploma at 38%. Notably poorer completion rates were recorded for both the lower and higher prior achievement groups. Completion rates for students planning to work (0%) and students planning to attend college (50%) contrast with those who reported plans for university or "other", where the percentages achieving a high school diploma were much higher than the provincial norms.

The highest achievement of diplomas was recorded for District #4, at 78%, primarily with higher achievements by females (90%). Students of all prior achievement groups did better in this district, but particularly the medium group. For the career plan groups, the college bound students were the only group below the norm, with particularly high achievement levels for students planning direct entry into work, and those bound for university.

The high prior achievement group of students, and the university bound groups appear to be well short of provincial norms in District #3, with 20% fewer students in the university bound group completing a diploma. Students with "other" career plans were also well below norms, while college and work bound students show diploma completion

rates higher than the norm.

One large school district (#6), had notably low percentages of the low prior achievement group and of the work bound students achieving a diploma. District #8 also had a low percentage of students completing the diploma who were among those planning to work immediately following high school.

Schools. Diploma completions within the illustrative schools ranged from 31% up to over 78%. Male and female completion rates varied considerably from school to school, ranging from School #3 which had 35% more females than males completing diploma requirements to School #12 with 19% more males than females doing so.

Two schools with very low percentages of students achieving a diploma were schools #7 and #11. In School #7 both male and female percentages were low and all three prior achievement groups were markedly below the respective norms. Students from all four career plan groups were also below their norms, with those planning to enter college or work following high school being furthest below the norm. In School #11, females particularly dropped below provincial norms. Students from the middle prior achievement group, and those planning on attending college had completion rates above average. No students who were planning on entering work directly after high school completed the high school diploma in the sample from School #11.

Over 78% of students in two of the schools completed diploma requirements. All categories of students in School #2 had completion rates above the norms with the exception of the group of students planning entry into college. The low prior achievement group had low completion rates at School #6, as did students whose career plans were

college or "other".

School #12 displays an atypical profile when compared with the others in that completion rates for males were 15% above average and rates for females were 13% below average. This school also had the lowest completion rate for the low prior achievement group and poor results for all students not planning on attending university.

Mean of High School Marks

The average of all high school marks for all students in the province was 61.6%. Females received marks close to 5% higher on the average than did the males. Marks were 5% higher in the medium prior achievement group than in the low, and 10% higher in the high group compared to the medium. Students with plans to attend university received marks higher than did those in the three remaining career groups.

Regions. Examination of Table 26 shows no important differences in the overall means of high school marks among the six geographical regions. Also, no substantial differences from region to region are evident for the analyses by sex of respondent, by prior achievement level and career plans.

Districts. Differences among the school districts were small with the possible exception of District #4, which stood out from the others in that the average high school mark was 4% above the provincial norm. For this district, students of both sexes and all three prior achievement groups, as well as most groups based on career plans, received marks higher than provincial norms. As reported in

TABLE 26

MEAN OF HIGH SCHOOL GRADES, DISAGGREGATED ACCORDING TO SELECTED STUDENT CHARACTERISTICS AND INSTITUTIONS

Institution	N	ALL	---Sex[1]---		--Achievement[2]--			--------Plans[3]--------			
			M	F	L	M	H	UNIV	COLL	WORK	OTHR
Provincial:	(2753)	61.6	59.4	64.0	56.4	60.0	69.2	67.1	62.1	59.4	61.6
Regions:											
Region #1	(580)	60.6	58.9	62.7	55.6	58.9	67.7	65.2	60.2	58.0	62.3
Region #2	(751)	61.5	59.8	63.2	55.1	59.6	68.7	67.2	61.6	59.3	60.0
Region #3	(332)	62.7	60.3	65.4	57.1	59.8	69.4	66.8	63.7	60.4	63.5
Region #4	(543)	62.0	59.5	64.5	57.2	61.1	69.4	68.5	63.2	59.8	62.0
Region #5	(256)	61.9	58.7	65.1	56.8	60.1	72.9	70.9	61.2	60.0	61.9
Region #6	(291)	62.0	59.2	64.4	57.1	60.6	70.0	67.9	62.1	58.8	61.4
Districts:											
District #1	(22)	63.2	57.2	68.2	56.7	67.1	70.8	66.2	64.8	62.0	58.3
District #2	(21)	59.0	57.6	60.5	53.1	59.6	69.5	58.0	71.0	53.2	62.9
District #3	(39)	62.1	60.5	64.7	58.8	60.2	69.1	71.5	61.1	59.8	60.2
District #4	(51)	65.6	60.3	69.7	60.3	61.0	72.1	73.7	60.6	64.8	62.6
District #5	(29)	61.0	58.1	64.6	56.0	54.9	75.5	69.8	56.7	57.5	67.4
District #6	(554)	61.4	60.0	62.7	54.3	59.2	68.7	67.1	61.7	58.9	60.0
District #7	(500)	60.8	58.9	63.1	55.1	59.0	68.0	65.8	60.4	58.0	62.3
District #8	(80)	59.7	58.8	60.5	57.8	58.2	65.3	61.5	58.3	58.2	62.1
District #9	(186)	61.8	58.9	64.5	56.6	60.8	69.3	67.4	61.1	60.1	59.8
Schools:											
School #1	(28)	59.1	55.4	62.3	55.8	58.9	63.5	62.3	60.3	56.7	56.6
School #2	(28)	63.0	60.2	66.7	57.2	59.9	68.1	71.0	60.7	61.7	63.0
School #3	(19)	61.1	59.7	63.4	57.7	53.8	76.0	69.8	59.5	54.7	74.0
School #4	(48)	60.1	57.9	63.6	53.3	59.0	71.7	70.3	64.7	55.4	55.7
School #5	(18)	59.6	56.4	63.5	56.4	66.5	65.5	62.2	60.4	0	63.0
School #6	(65)	62.9	61.2	64.6	51.7	57.5	68.2	70.2	61.0	60.5	58.5
School #7	(54)	56.0	54.6	58.6	53.6	57.3	65.6	63.2	60.0	56.9	55.3
School #8	(72)	62.2	63.8	61.1	55.3	59.3	70.5	65.6	64.8	64.8	63.7
School #9	(50)	61.3	57.7	64.2	53.6	63.3	70.6	70.5	63.7	58.6	59.5
School #10	(48)	61.4	62.2	60.1	59.3	60.6	72.3	68.9	62.5	62.8	60.5
School #11	(34)	58.9	57.7	59.8	53.3	60.3	68.7	63.4	64.1	52.6	58.3
School #12	(43)	61.7	60.4	64.3	54.4	62.3	64.0	66.2	58.2	59.8	60.4

[1]Sex: "M" - male, "F" - female
[2]Achievement: "L" - low, "M" - medium, "H" - high
[3]Plans: "UNIV" - university, "COLL" - college, "WORK" - work after high school, "OTHR" - other plans

the previous section, District #4 was one of the two districts having the highest percentage of students completing a high school diploma.

Schools. The two schools with the highest average high school mark (#2 and #6) were the ones shown in Table 25 as having the highest percentage of students achieving a diploma. Schools #7 and #11 had the lowest average grades and were the two schools which had the lowest completion rates for the high school diploma.

For School #2 the mean of the marks for females was the highest of the illustrative schools selected and that for males only slightly above the norm for males. Average marks were above provincial norms for the low achievement group but slightly below for the other two prior achievement groups; above the norm for students with career plans other than college and slightly below for the college bound group. For School #6, average marks for all three prior achievement groups were below the provincial means yet the overall mean for the school was second highest among schools and above the provincial norm. This could only be explained by the school having unusually high proportions of their students within the high prior achievement group. Students with university plans at this school appear also to have achieved higher average grades when compared with the provincial average.

For School #7, students from all groups within both the prior achievement and career plans categories had average marks well below provincial averages. For School #11, on the other hand, marks for the medium and high prior achievement students were close to provincial means but for the low achievement group they were about 3% below. For students who had planned to attend college after leaving high school

marks were above average, whereas for the other three career groups they were below the provincial averages.

Two schools (#8 and #10) had male students with higher average marks than those of the female students. This was atypical and may have been related to the accompanying higher than average marks for students planning to enter work.

Student Programs Within Regions and Districts

Disaggregation of the quality indicatqr "Percent Achieving A High School Diploma" was undertaken for regions and for representative school districts, based on the ability of the student and the type of program followed in high school. In order to assist in interpreting the findings for the various sub-groups, corresponding enrollment figures were also provided. These figures are presented in Table 27 and reflect enrollment patterns within regions and districts for the Business, Vocational, Matriculation and General programs broken down further by the ability level of the students. The percentages of students achieving a high school diploma within each sub-group, may be indicative of extent to which each program was providing an appropriate educational experience for the particular ability group within each region and/or district. The numbers displayed prior to the slash (/) are percentages of that ability group enrolled in the particular program. The numbers following the slash (/) are the percentages of students within that specific group achieving a high school diploma.

While figures are presented for the six geographical regions and

TABLE 27

PERCENT ACHIEVING HIGH SCHOOL DIPLOMA DISAGGREGATED ACCORDING TO PRIOR ACHIEVEMENT WITHIN STUDENT PROGRAM AND INSTITUTION

		Business				Vocational				Matriculation				General			
Institution	"N"	Total	Low	Medium	High	Total	Low	Medium	High	Total	Low	Medium	High	Total	Low	Medium	High
Provincial:	2753	9/66	17/62	8/71	1/77	8/55	13/55	7/52	3/66	52/84	20/76	54/81	83/89	31/36	50/32	31/40	13/38
Regions:																	
Region #1	580	7/66	18/67	5/70	.5/ 0	10/59	17/64	12/44	4/87	53/82	17/79	54/76	80/86	30/35	48/28	29/50	16/27
Region #2	751	8/58	16/55	8/62	1/67	8/43	17/44	5/33	3/62	56/84	27/68	62/86	80/88	27/28	40/19	24/34	15/42
Region #3	332	8/61	18/56	9/70	1/50	5/67	10/56	5/83	2/67	55/83	18/81	47/71	85/89	31/47	53/45	38/52	11/40
Region #4	543	9/76	16/72	8/80	2/99	8/59	12/61	9/56	4/57	46/85	14/89	47/77	81/90	36/37	57/38	35/34	12/38
Region #5	256	12/68	18/55	11/87	4/99	7/59	12/61	3/50	3/50	48/90	20/82	53/87	86/95	34/34	50/34	34/28	7/60
Region #6	291	10/67	19/67	7/62	1/99	2/67	.9/ 0	4/99	1/ 0	52/85	21/70	55/86	93/89	35/37	58/33	34/40	4/67
Districts:																	
District #1	22	9/ 0	29/ 0	0/ -	0/ -	0/ -	0/ -	0/ -	0/ -	45/90	0/ -	0/ -	83/90	45/50	71/40	99/99	17/ 0
District #2	21	5/ 0	0/ -	9/ 0	0/ -	0/ -	0/ -	0/ -	0/ -	52/64	33/50	45/99	99/25	43/11	67/ 0	45/20	0/-
District #3	39	0/ -	0/ -	0/ -	0/ -	0/ -	0/ -	0/ -	0/ -	64/76	25/67	61/75	99/79	36/50	75/44	38/60	0/-
District #4	51	13/57	33/33	23/75	0/ -	13/71	56/80	0/50	8/ 0	55/96	0/ -	41/86	84/99	18/44	11/ 0	35/50	8/50
District #5	29	10/67	15/50	10/99	0/ -	21/50	38/60	10/ 0	0/ -	45/77	15/99	50/60	99/83	24/14	31/25	30/ 0	0/-
District #6	554	7/57	14/48	6/75	2/67	8/35	16/38	4/22	12/40	59/85	29/67	67/87	81/89	26/27	40/20	23/33	15/38
District #7	500	6/62	17/59	5/78	.5/ 0	11/61	19/68	13/46	4/87	53/82	14/79	53/76	79/87	29/36	50/27	28/50	16/30
District #8	80	11/78	23/87	4/ 0	0/ -	5/25	9/33	4/ 0	0/ -	51/80	26/78	56/77	86/84	32/35	43/33	35/50	14/ 0
District #9	186	13/58	23/67	12/44	0/ -	12/64	18/58	10/57	6/99	46/82	20/69	49/81	77/89	30/33	39/19	29/38	17/62

Note: entries are of the form " x / y " where "x" indicates the percentage of that ability group enrolled in the particular program, and "y" indicates the percentage of that specific group achieving a high school diploma.

the nine school districts, for purposes of example, attention is directed to districts #4, #6, and #7. Two of these districts (#6 and #7) were selected for closer examination mainly because of the larger N's and the third one (#4) mainly because the results differed somewhat from those of the other districts. Also evident in the table is the absence of Business and/or Vocational programs in some districts.

District #4. The figures displayed for District #4 show notably higher percentages of students enrolled in the Business (13% versus 9%) and Vocational (13% versus 8%) programs and lower percentages in the General program (18% versus 31%) but about the same percentages in the Matriculation program, when compared with provincial norms. Focusing on the Business program, enrollments come entirely from the low and medium ability groups with percentages achieving a diploma much lower within the low ability group when compared with the provincial norm (33% versus 62%). The Vocational program within this district shows both a higher enrollment rate (13% versus 8%) and much higher diploma achievement rate (71% versus 55%), particularly for the low ability student where 56% were enrolled (versus 13%) and 80% of these achieved a diploma (versus 55%). In the Matriculation program, enrollments were slightly higher overall (55% versus 52%) but there was zero enrollment from the low prior ability group, whereas the provincial average was 20% for this group. Ninety-six percent of the Matriculation students in this district achieved a diploma compared with 84% provincially. This district enrolled almost half the normal percentages (18% versus 31%) in the General program with a somewhat higher rate of diploma completion as well.

This profile appears to indicate that this district has a combination of enrollment policies and program offerings which are meeting the needs of students to a greater extent than the other districts shown in the table. One exception to this generalization is the Business program, particularly with respect to the low prior ability group.

Districts #6 and #7. Comparing the two largest districts with each other yields some interesting findings which may be related to district policies and could prompt more in-depth evaluations.

Enrollment rates show approximately equal total percentages enrolled in the Business program, but with District #7 enrolling notably more in the Vocational and General programs and District #6 enrolling more in the Matriculation program. While total enrollment rates are similar in the Business program, District #7 enrolled 17% (compared with 14% in District #6) of the low prior achievement student. In the Vocational program, as in Business, District #7 enrolled higher percentages of students from the low and medium prior achievement groups. District #6, on the other hand, enrolled higher percentages of students from all three ability levels in the Matriculation program. Patterns similar to both the Business and Vocational programs are evident in the General program, with District #7 enrollments higher from the low and medium achievement groups.

Overall percentages of students achieving a high school diploma within the two districts had previously been found (Table 25) to be very close (64.1% versus 65%). The breakdowns provided in Table 27 however, show considerable differences by program. Percentages achieving a high school diploma are 9% to 26% higher for District #7

in the Business, Vocational, and General programs, whereas District #6 completion rates are higher by three points in the Matriculation program.

Comparisons between Districts #6 and #7 also show considerable differences within the various groupings based on prior achievement. Higher percentages of the low prior achievement student, in District #7 achieved a high school diploma within all four programs. This difference was greatest in the Vocational program, where 68% of the low prior achievement group achieved a diploma in District #7, compared with 38% in District #6. For the medium prior acheivement groups, higher percentages achieved a diploma in District #7 in all programs except the Matriculation program. Students in the high prior achievement group showed higher completion rates in District #6 however in all programs except the Vocational program.

Summary

Two selected indicators of quality education were disaggregated to the six regions of the province along with a few school districts and a few schools that were selected for illustrative purposes. The percentage of students achieving a high school diploma and the average high school mark were selected as the indicators of quality education to be used.

Regional differences were not great, but the percentage achieving a diploma was found to vary from 38% to 78% among the school districts and from 31% to 78% among the illustrative schools. Average high school marks were also shown to vary notably among the districts and schools. The findings also revealed differences among the schools and districts, in the percentage of students achieving a diploma, for

sub-groups based on the sex of the student as well as the prior achievement groupings.

A further disaggregation was undertaken to show both the enrollments and percentage achieving a high school diploma, for the three prior achievement groups within each of the four student programs, for each of the six regions and nine districts. These findings revealed differences in enrollments within the various programs, with levels of diploa achievement being higher in some districts for some prior achievement groups and low for others, when comparing districts.

Summary

This chapter has presented the results of the information phase, which encompassed sub-problems four, five, and six. Following is a brief summary of the findings associated with each sub-problem.

Sub-problem 4

Sub-problem 4: to compute provincial norms for each indicator of quality education.

Provincial norms were computed for each indicator of quality education. The general quality indicators showed 65% of the student group achieving a high school diploma and 30.5% attaining matriculation status. The average mark achieved by students over all high school subjects was 61.6%.

The external quality indicators exhibited provincial norms including:

a. 1.7 average years of further education,

b. 5.8% unemployed,

c. 31.1% earning over $12,000,

d. 64.4% satisfied or very satisfied with their career, and

e. 55.3% rating the goals overall as adequately or very adequately achieved, with the highest goal receiving a rating of 69.2% and the lowest 40.6%.

The subject area quality indicators computed provincially included measures of the extent of participation by students, levels of achievement in the subject areas, and ratings of the subject area objectives. The extent of participation within each subject area ranged from .8 to 13.1 average credits per student and 11.3% to 99.1% of the students taking one or more courses. The level of achievement indicators displayed average grades in the range of 58.8% to 73.3%, with 84.7% of the students in one subject area receiving an A or B and 32.4% of students receiving such grades in the subject area at the other end of the continuum. The average adequacy rating on the subject area objectives ranged from 42.9% adequate or very adequate to 76.6%.

Sub-problem 5

> Sub-problem 5: to identify, for selected indicators of quality education, differences among groups of students classified on the basis of student programs and student characteristics.

Each of the general indicators of quality education were disaggregated based on student characteristics of sex, previous achievement, career plans, and on student program. Further disaggregations of the indicators based on the selected student characteristics were computed for each of the four student programs respectively.

The findings presented revealed notable differences between male and female achievements, with females scoring higher on most of the general indicators. Previous achievement (categorized into low, medium, and high) displayed differences favoring the next higher category of up to 20 percentage points on some indicators. One exception to this trend was the unemployment rate, with the highest rate reported for the high achievement group.

The statistics resulting from the disaggregations by student program, revealed generally higher levels for the Matriculation program on the internal indicators but higher levels for the Vocational and Business programs on some of the external indicators. For the most part, the General program showed lower levels on both internal and external indicators when compared with the other programs. The Vocational and Business programs had enrollments primarily from the low and medium prior achievement groups and achievement rates for these groups were notably higher than for the similar student in the General program.

Quality indicators disaggregated by student characteristics within each subject area were computed, providing an overview of student participation and achievement by students of different sex, prior achievement, and career plans. Enrollment patterns revealed a higher percentage of females enrolled in the Matriculation routes, and in Second Languages, Business Education, Drama, Music, and Home Economics. Male enrollments were higher than females in the General routes and in Industrial Education. Achievement levels of females were generally higher than for males, but especially in the General routes and more so in English and Social Studies than in Mathematics.

Sub-problem 6

> Sub-problem 5: to identify, for selected indicators of quality education, differences among groups of students classified on the basis of student programs and student characteristics.

Focusing on two of the general indicators (percentage of students achieving a high school diploma and the average high school mark) and selecting nine school districts and 12 schools for illustrative purposes, scores were computed for sub-groups identified on the basis of the selected student characteristics.

The results revealed differences among schools and districts ranging from 31% to 78% of the students achieving a high school diploma overall, and additional differences upon an examination of the various student sub-groups. For example, some schools showed achievement rates higher for males than for females, others exhibited notable differences from the provincial norm for the low achievement group, or in another instance, the work bound student.

A further disaggregation showing both enrollments and percentage achieving a diploma for the three prior achievement groups within each of the four student programs was computed. Marked differences from one school district to the next were revealed, which may have been the result of certain enrollment policies or differences in program effectiveness within the districts.

The next chapter provides an overall summary of the study along with conclusions and implications.

CHAPTER 7

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

This chapter presents a summary of the study, some conclusions and several implications. In the final part of the chapter, a number of recommendations for further research are identified.

Summary

The research was exploratory in the field of macro indicators of educational effectiveness. The major area of interest was the identification of procedures for evaluating on-going school programs. The need for more information regarding the quality of schooling generally in the province of Alberta and, more specifically, the quality of education within general curricular areas and within major institutional units was the major concern of the study. The focus was on the provision of summary information of a quantitative nature, rather than descriptive qualitative information.

Purpose and Problems

The purpose of the study was to test a model for monitoring an educational system. It was intended that such a monitoring approach would provide information on the quality of education in various program areas and at system and subsystem levels thereby providing guidance for curriculum policy changes and information for decision making on resource allocations.

The problem involved the identification of appropriate variables

and an illustration of several ways in which such variables could be used in fulfilling the purposes outlined. The sub-problems adopted for the study were as follows:

1. to identify general and subject area indicators of quality education,
2. to identify student-based and school-based variables which account for significant variance in the indicators of quality education,
3. to determine, for selected indicators of quality education, the total variance which is accounted for by the student-based and school-based variables and the explanatory power of each of these variables,
4. to compute provincial norms for each indicator of quality education,
5. to identify, for selected indicators of quality education, differences among groups of students classified on the basis of student programs and student characteristics,
6. to develop profiles for selected schools and districts using the various indicators of quality education.

Conceptual Framework

A variety of concepts which can be used to describe an evaluation perspective, along with the potential contributions of curriculum evaluation theory and other related fields were reviewed. A particular evaluation perspective was outlined, and a model which could be used when monitoring on-going school programs has been presented.

The particular perspective that has been outlined is a macro perspective of program evaluation, which is evaluation of a "gross" nature at "general" institutional or curricular levels, using quality indicators as the major informational tool. Guiding principles for the identification of these indicators of educational quality included:

a. an emphasis on curriculum goals and objectives,

b. brief summary statistics for the policy level decision maker,

c. an inductive inquiry approach,

d. accountability to the public a prime objective,

e. provision of information without judgements,

f. focus on the provincial and school district levels of organization,

g. an emphasis on improving discriminatory capabilities in identifying "programs" taken by students,

h. careful adherence to variable categorizations,

i. a recognition of related evaluative disciplines such as needs assessments, organizational effectiveness and information systems.

The conceptual model presented, proposed a three phase evaluation approach with these phases to be used in a cyclic manner. The three phases are: (a) the data collection and preparation phase, (b) the inductive inquiry phase, and (c) the information phase. The present study used existing data, hence the focus was on phases b and c. Three steps were outlined for each of the two phases. These were the source of the six sub-problems of the study. The steps describe the procedures to be followed in taking the variables collected,

identifying potential quality indicators from these variables, and determining which of the antecedent and transactional variables are most associated with variance in the quality indicators.

The model also portrays the close relationship that program monitoring at the macro level has with more in-depth needs assessments, educational research, curriculum evaluation, organizational effectiveness studies, and the general social indicator movement.

Methodology

The methodology differed for the first three and the last three sub-problems of the study. In the former case, the inductive inquiry phase of the study, exploratory and analytical statistics were used, and comparisons made of the various results in order to identify which variables might have utility as indicators of educational quality. For the remaining three sub-problems which were associated with the information phase of the study, use was made of descriptive statistics only in order to present the quality indicators in such a manner that the loci of differences in these indicators might be identified at the various institutional and program levels.

The outcome variables used in developing the indicators of educational quality included official Department of Education goals and objectives, accepted achievement indicators within the schools such as marks and credit achievements, and career outcomes such as post secondary education, occupational status, etc.

Specific methodologies used for each of the six sub-problems were:

1. Identifying quality indicators. Outcome variables, where possible goal referenced, were examined for potential overlap using intercorrelation data and thoughtful examination.
2. Identify explanatory variables. A two step procedure was utilized which included a statistical procedure called SEARCH followed by analysis of variance.
3. Relative explanatory power. Two approaches were used for the purposes of comparison, both depended upon Multiple Classification Analysis. One approach provided overall multiple correlation coefficients with beta ratings of the relative contribution of each independent variable. The second approach computed the "marginal" explanatory power of each independent variable.
4. Identify provincial norms. Computation of means was done where these were appropriate, and in other instances percentages were compared.
5. Achievement levels using quality indicators disaggregated according to students characteristics. Crosstabulations and percentage comparisons were used.
6. Achievement levels using quality indicators disaggregated according to various student characteristics for selected school districts and schools. Crosstabulations and percentage comparisons were used.

Results: Inductive Inquiry Phase

Following are the major findings associated with each sub-problem.

Sub-problem 1. General quality indicators identified were of two types: internal and external. The main internal indicators related to achievements within school were:

- Percent achieving a high school diploma,
- Percent achieving matriculation,
- Average of high school marks.

The external indicators identified, concerned career achievements as reported five years after school, and the ratings of 12 goals of education. The career achievement indicators were:

- Average years of further education,
- Percent unemployed and seeking a job,
- Average Pineo-Porter job status level,
- Percent earning over $12,000 annually,
- Percent Satisfied/very satisfied with their career.

The goal ratings indicators were:

- Percent rating adequate or very adequate: "Basic Competencies"
- Percent rating adequate or very adequate: "Use Information"
- Percent rating adequate or very adequate: "Communication Skills"
- Percent rating adequate or very adequate: "Health, Fitness, Safety"
- Percent rating adequate or very adequate: "Respect Others"
- Percent rating adequate or very adequate: "Desire Learning"
- Percent rating adequate or very adequate: "Understand Changes"
- Percent rating adequate or very adequate: "Good Citizenship"
- Percent rating adequate or very adequate: "Leisure Time"
- Percent rating adequate or very adequate: "Appreciate Culture"

- Percent rating adequate or very adequate: "Management Skills"
- Percent rating adequate or very adequate: "World of Work"

Subject-area indicators identified for each subject area were:

1. Extent of student participation in each subject area.

Seventeen indicators (#1-#17) concerning average credits per student in subject areas were identified: Matriculation English, General English, Social Studies, Social Science, Matriculation Mathematics, General Mathematics, Matriculation Science, General Science, Second Languages, Art, Drama, Music, Physical Education, Business Education, Home Economics, Industrial Arts, Vocational Education.

Another 17 indicators (#18-#34) concerning percentage of students taking one or more (1+) courses in subject areas were identified: Matriculation English, General English, Social Studies, Social Science, Matriculation Mathematics, General Mathematics, Matriculation Science, General Science, Second Languages, Art, Drama, Music, Physical Education, Business Education, Home Economics, Industrial Arts, Vocational Education.

An additional 17 indicators (#35-#51) related to the average number of courses taken by those involved in subject areas. These were: Matriculation English, General English, Social Studies, Social Science, Matriculation Mathematics, General Mathematics, Matriculation Science, General Science, Second Languages, Art, Drama, Music, Physical Education, Business Education, Home Economics, Industrial Arts, Vocational Education.

2. Marks achieved by students in each subject area.

Seventeen indicators (#52-#68) related to the average mark achieved by those involved were computed in each of the following subject areas: Matriculation English, General English, Social Studies, Social Science, Matriculation Mathematics, General Mathematics, Matriculation Science, General Science, Second Languages, Art, Drama, Music, Physical Education, Business Education, Home Economics, Industrial Arts, Vocational Education.

3. Grade distribution in each subject area.

Another 17 indicators (#69-#85) concerned the percentage of A and B grades by those involved in subject areas: Matriculation English, General English, Social Studies, Social Science, Matriculation Mathematics, General Mathematics, Matriculation Science, General Science, Second Languages, Art, Drama, Music, Physical Education, Business Education, Home Economics, Industrial Arts, Vocational Education.

One more set of 17 indicators (#86-#102) identified the percentage of D and F grades achieved by those involved in subject areas: Matriculation English, General English, Social Studies, Social Science, Matriculation Mathematics, General Mathematics, Matriculation Science, General Science, Second Languages, Art, Drama, Music, Physical Education, Business Education, Home Economics, Industrial Arts, Vocational Education.

4. Evaluation of the achievement of objectives within each subject area.

An average adequacy rating (#103-#114) was computed for each of 12 subject areas: English, Social Studies, Social Science, Mathematics, Science, Second Languages, Art, Drama, Music, Physical Education, Business Education, Industrial Education.

Sub-problem 2. One-way analysis of variance was undertaken for each of the independent variables using selected quality indicators as the dependent variables. Generally, the relative predictability of the independent variables did not differ from one dependent variable to the next. Based on the extent of variance in the outcome measures accounted for, seven of the independent variables were selected for further analysis. These seven were student program (v54), pupil-teacher ratio (v58), sex of respondent (v63), T-SCAT (v66), grade nine average mark (v73), self ability rating (v74), and career plans (v78).

Sub-problem 3. The analysis revealed that over 50 percent of the variance in high school achievement level and in the average high school mark was accounted for by the five predictors (v54,v58,v63,v66,v73) selected for analysis. Predictability of subject area outcomes varied from high in matriculation English to a low in Music. Both approaches demonstrated the significant degree of association between the program that the student follows in high school and the achievement of most of the internally measured outcomes. To a lesser extent, but more than for other predictors, the same was found for the externally measured indicators of quality education.

Results: Information Phase

The information phase of the study was primarily concerned with the presentation of scores on the quality indicators in a form that would help policy makers and curriculum planners gain a general idea of the quality of education in their area of interest. Sub-problems 4, 5, and 6 associated with this phase focused in turn on (a) the provincial scene, (b) various sub-groups of students based on antecedent characteristics or school program, and (c) various representative organizational units. The findings for these sub-problems were as follows:

Sub-problem 4. Two types of provincial level quality indicators were identified. The first of these focused on "schooling" generally and the second on each of 17 subject areas at the general level. Some of each of the two types were based on school data (internal), and others on follow-up data (external).

For the general quality indicators, provincial norms based on the particular sample data used, were computed. These norms were:

1. Internal
   - Sixty-five percent of students achieved a high school diploma.
   - Thirty percent of students achieved matriculation status.
   - The average high school mark over all courses was 61.6%.
2. External (5 years after high school)
   - Average years of further education was 1.7.
   - Average unemployment rate was 5.8%.
   - Average job status level (Pineo-Porter) was 46.
   - Thirty-one percent reported earning $12,000 or more.
   - Sixty-four percent reported being either satisfied or very

satisfied with their career.

- Overall, the goals of education were rated adequately or very adequately achieved by 55% of respondents.

These norms present the provincial picture for a particular year. They provide a base for comparison with sub-groups within the sample or for comparison with similar samples in other years.

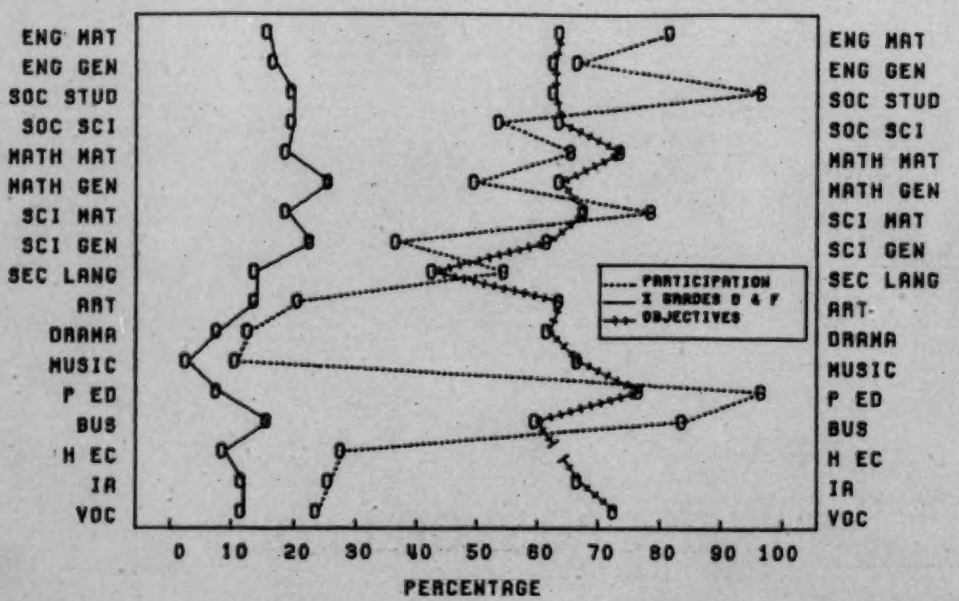
Subject area quality indicators yielded provincial norms showing (a) the level of student participation, (b) the level of student achievement, and (c) student ratings of the achievement of objectives for each of the 17 subject areas.

In Figure 3, three selected quality indicators are presented in a profile format based on data taken from Table 9. The profile on student participation in each subject area graphically displays the differences from subject area to subject area in the percentage of students taking one or more courses; the profile on level of achievement presents at a glance, comparisons in the percentage of students receiving a grade of either D or F in the 17 subject areas; and the profile on rating of subject area objectives presents a similar graphical representation for the third variable. The following generalizations can be drawn from these profiles:

1. Participation:
   - the percentage of students taking one or more courses in each of the subject areas ranged from 99% in Social Studies and Physical Education, to lows of between 10 and 20% in Music, Art and Drama;
   - general courses in English, Social Studies, Mathematics, and Science enrolled considerably fewer students than did their

Figure 3

COMPARISON OF SUBJECT AREAS ON THREE QUALITY INDICATORS



matriculation counterparts;

- Home Economics, Industrial Arts, and Vocational Education subject areas each enrolled about 25% of the students who took at least one course in the subject area.

2. Achievement:

- the highest percentage of students receiving grades of D or F was found in the general Mathematics and general Science courses,
- low grades were less prevalent in English courses than in Social Studies or Social Sciences,
- the fewest D and F grades were found in Drama, Music and Physical Education with Music being the lowest of the three.

3. Objective ratings:

- subject areas with the highest ratings on the adequacy with which they were deemed by ex-students as meeting their objectives included Physical Education, Matriculation Mathematics and Vocational Education,
- the Second Language program objectives were considered to be less adequately achieved than were those for the other subject areas.

Sub-problem 5 focused on a more detailed examination of the relationship between each of sex of respondent, prior achievement level, and student program on the one hand and the quality indicators on the other. These three variables, based on student characteristics, had earlier been identified as being associated with the greatest amount of variance in the quality indicators.

Figures 4 and 5 present in graphic form, the general quality indicators differentiated by sex of the student. Figure 4 reveals that over 10% more females than males achieved a high school diploma. Also displayed is the higher percentage of females attaining matriculation status and higher average high school grades. In terms of employment level, no difference is evident in the unemployment rate. Females are shown as holding higher prestige jobs on the average, but a greater percentage of males received wages of $12,000 or more per year. The level of job satisfaction appeared to be about the same for both sexes.

A somewhat greater percentage of females than males rated the general goals as adequately or very adequately achieved. A more detailed examination of the ratings for individual goals is presented

Figure 4

GENERAL INDICATORS - BY SEX

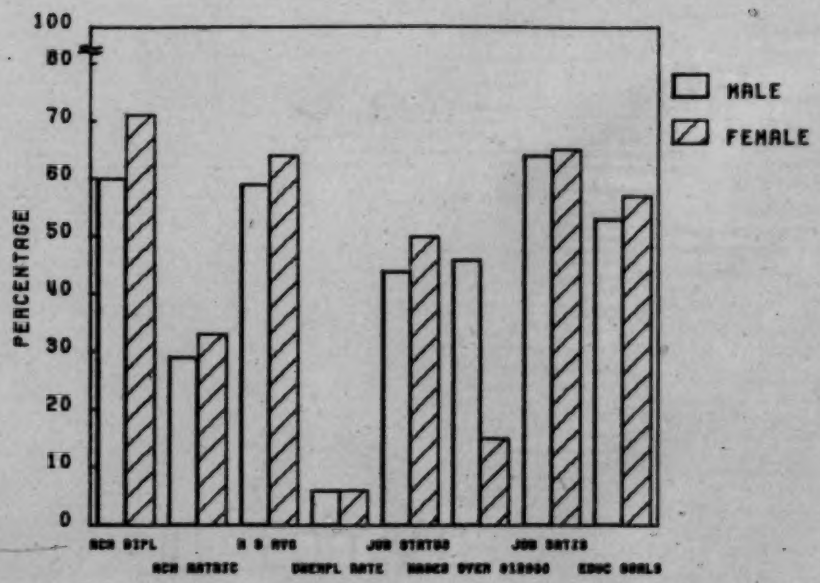
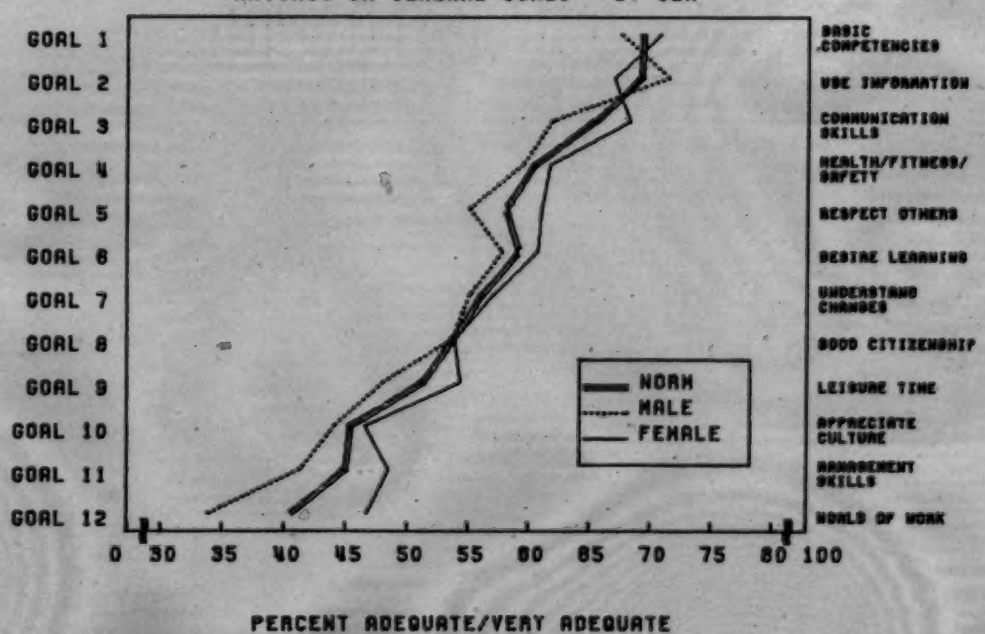


Figure 5

RATINGS ON GENERAL GOALS - BY SEX



in Figure 5 which shows a greater percentage of females than males rating the level of goal achievement as adequate or very adequate for each goal except Goal 2, "use information." The difference is greatest in the case of Goal 12 which pertained to preparation for the world of work.

Figures 6 and 7 focus on possible differences in the indicators of general quality based on different levels of prior achievement by the students, utilizing their grade nine average. Differences of close to 20% in the percentage of students attaining a high school diploma are evident between the low and middle and also the middle and the high prior achievement groups. Even larger differences are evident in the percentages of each group attaining matriculation status, with only 20% of the middle group and three percent of the low prior achievement students gaining matriculation. Differences among the three groups, although in the same direction, were not as great for average grades achieved throughout high school. Occupationally, there was a lower rate of unemployment for the middle prior achievement group than for either of the other two groups. Job status level increased somewhat from the low through the middle and the high prior achievement groups but all three groups were about the same on career satisfaction. Differences among the three groups for the remaining variables in Figure 6, namely, wages, and goals were minimal.

Overall, the achievement of the general goals was rated somewhat lower by the high prior achievement group of former students. Differences among the three prior achievement groups, in the average percentage of respondents rating the goals of education having been

Figure 6

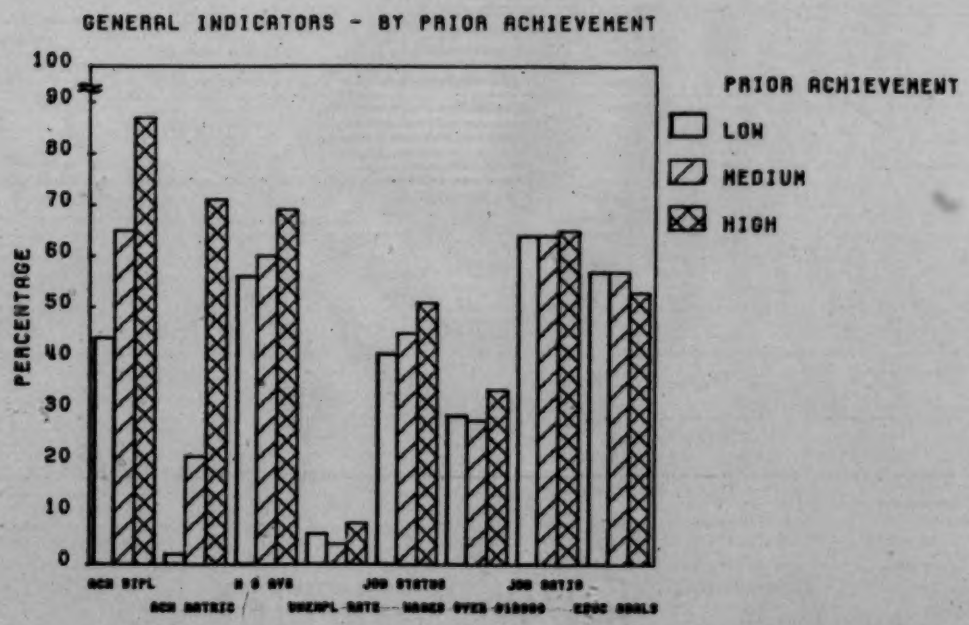
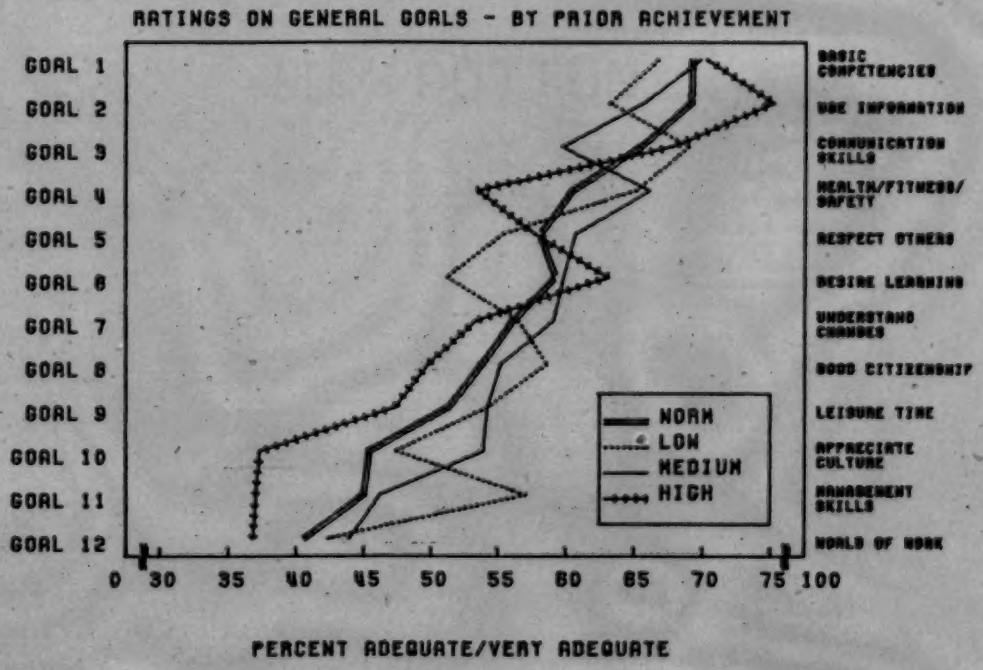


Figure 7



adequately or very adequately achieved, varied from goal to goal as evident in Figure 7. Goals rated higher than the norm by the high prior achievement students were often rated lower than the norm by the low achievement students, and vice-versa, with the middle achievement group falling somewhere in between. The high group had higher adequacy ratings for goals 1, 2, and 6 dealing with the development of basic concepts, using information, and creating a desire for learning. On the other hand, they had the lowest adequacy ratings for goals 4, 7, 8, 9, 11, and 12 dealing with individual and social well-being and work preparation. The middle group had ratings higher than the norm for all goals except goals 2 and 3, dealing with learning to use information and developing communication skills respectively. The development of management skills (goal 11) was rated notably higher by the low prior achievement group than either the medium or high groups.

Figures 8 and 9 illustrate the differences among the four student programs with respect to the general indicators. For the high school diploma variable, percentages recorded were highest for students from the Matriculation program and lowest for students from the General program. Few students achieved matriculation status other than those enrolled in the Matriculation program. Average high school marks followed the same pattern as for the diploma variable but with the differences considerably less. Not shown in the graph, the number of years of further education, indicated students from the Matriculation program reporting the largest number, with Business Education students reporting the lowest and students from the other two programs on average falling about half-way between.

Figure 8

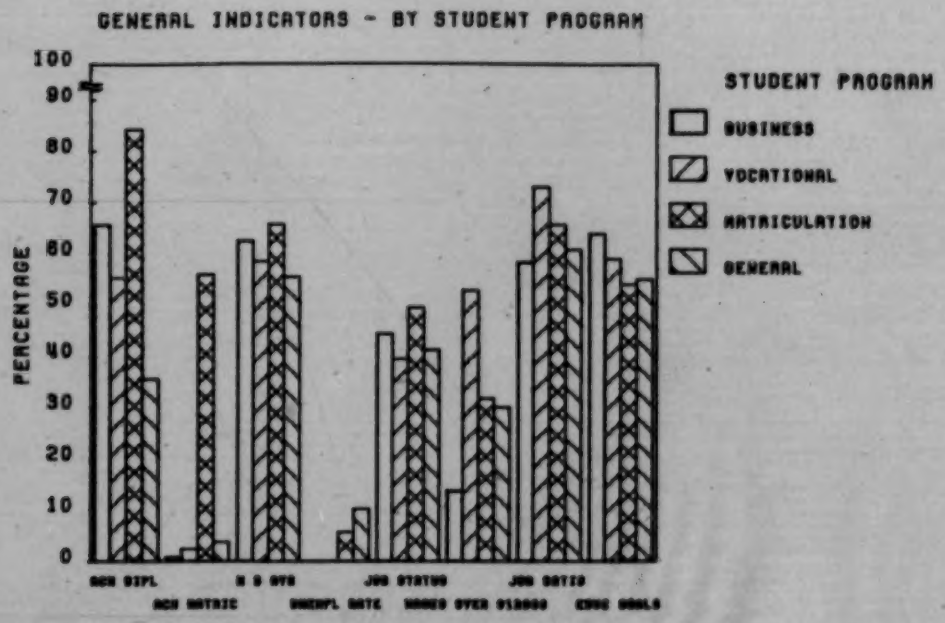
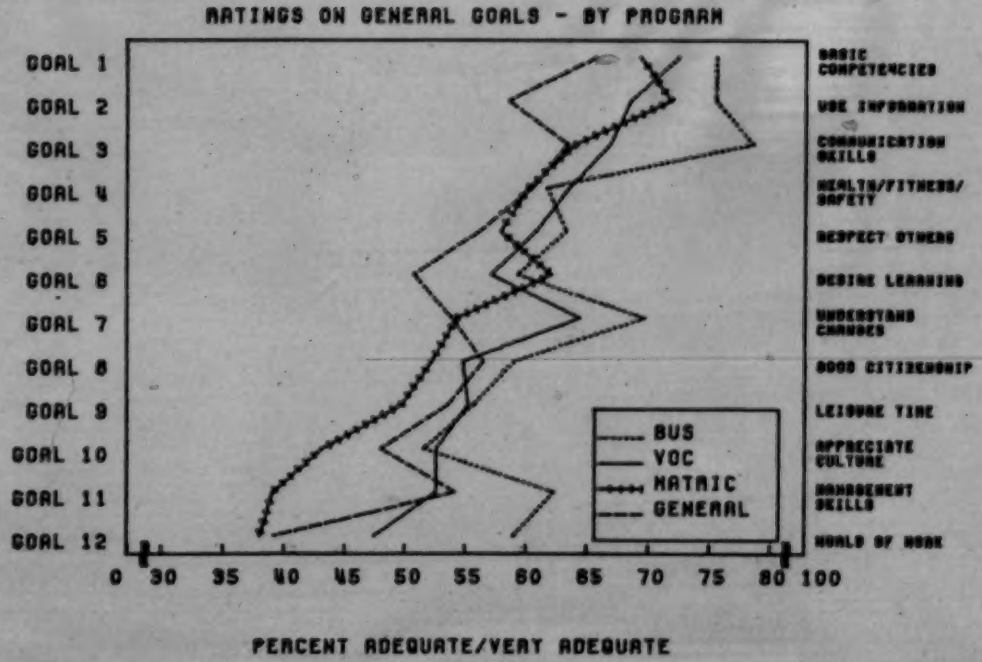


Figure 9



In relation to the unemployment variable, both Business and Vocational students showed zero unemployment with the highest rate registered for the General program. Job status level (Pineo-Porter ratings) was highest for graduates from the Matriculation program, followed by the Business, the General and the Vocational programs. Students from the Vocational program however reported a notably higher wage level, with Business students reporting the lowest wages and the Matriculation and General students being approximately equal and falling midway between the Business and Vocational groups. Career satisfaction was highest for students from the Vocational program, followed by those from the Matriculation, General and Business programs.

Overall, the adequacy of educational goal achievement was rated highest by students from the Business Education program, followed by those from the Vocational Education program. Figure 9 presents in profile form the ratings by program for each of the 12 goals. The profile for the Business program displays ratings on the 12 goals higher in most instances than in the other three programs. In the case of goal 3 (communication skills), goal 11 (management skills), and goal 12 (world of work), the ratings by the former students of the Business program were notably higher than was the case for the other programs. The profile for the Matriculation program displays ratings considerably lower than the other three programs in the case of goals 8, 9, 10, 11, and 12. The General program profile displays ratings higher than the Matriculation program on goals 8 to 12, but lower or equal on goals 1 to 8. The profile for the Vocational program falls midway among the others, usually higher than the Matriculation and

General programs but lower than the Business program.

Sub-problem 6 focused on the quality of education within selected institutional units. Six geographical regions of the province were examined along with nine selected school districts/counties and 12 illustrative schools chosen to be representative in terms of size and geographic location. Regional differences were minimal and for this reason are not reported in detail in this summary chapter. On the other hand, differences among the school districts as well as among the schools chosen for comparison were quite marked. These differences are illustrated in Figures 10 and 11.

In these two figures, the percentage of students achieving a high school diploma from four of the school districts and three of the schools selected from the larger groups of districts and schools are presented, based on the computations reported earlier in Table 25. District 4 showed notably higher percentages achieving a diploma (13% overall), especially in the case of the females and the low and middle prior achievement groups. Much lower percentages for all groups within District 2 achieved a diploma. Comparisons between districts 6 and 7, reveal a great similarity between them with one exception: for the low prior achievement group, the percentage achieving a diploma is about 10% lower in District 6.

The schools comparison in Figure 11 reveals that for both males and females, School 7 had close to 40% fewer students receiving a high school diploma than did either of the other two schools. The difference was not quite as marked in the case of the three prior ability groups. Further comparison between the male and female profiles reveals that School 8 differs from the other two in the

Figure 10

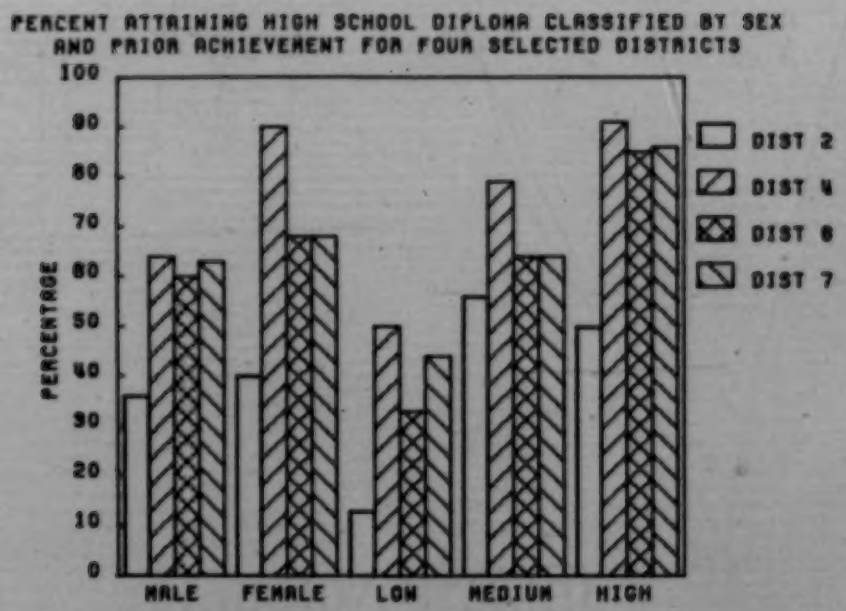
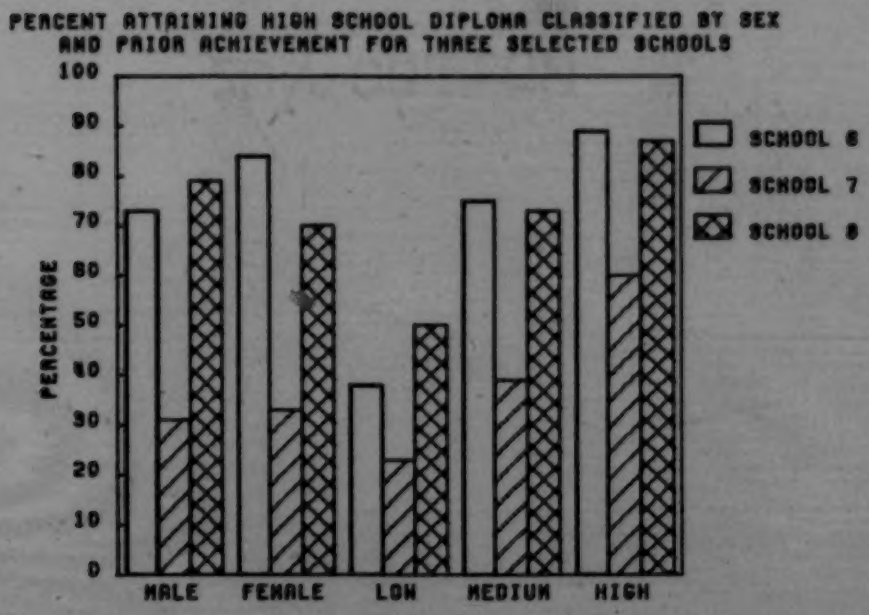


Figure 11



relative distribution between the two sexes. School 8, in contrast to the other two schools and to the provincial norm, had a lower percentage of females than males achieving a diploma. Profiles for the three prior ability groups are very similar with the exception of the low prior ability group which is the only one where School 6 has a lower percentage of graduates attaining the high school diploma than School 8.

Comparisons of districts on their average high school grades assigned showed differences much less pronounced than when comparing the achievement of a diploma. District 4, which showed high achievement on the diploma indicator, did however have somewhat higher grades as well. Overall averages recorded for the selected schools showed a spread of less than five percentage points. Differences larger than this however were recorded for some of the prior achievement groups. Table 26 may be referenced for more detail.

For the purposes of illustrating in summary form the findings from the previous chapter, particularly those contained within Table 27, two additional figures, Figures 12 and 13 were devised. Figure 12 presents a comparison of the percentage of students attaining a high school diploma, focusing on prior achievement groups within each of the four student programs. In order to facilitate comparison between diploma profiles and enrollment profiles for the same two districts, Figure 13 was devised.

In the Business Education program, as Figure 13 reveals, enrollments were very similar for all three prior achievement groups in both districts, with most students coming from the low prior achievement group and very few from the high. In contrast, as Figure

Figure 12

PERCENT ATTAINING HIGH SCHOOL DIPLOMA WITHIN PROGRAM
CLASSIFIED BY PRIOR ACHIEVEMENT LEVEL FOR TWO SELECTED DISTRICTS

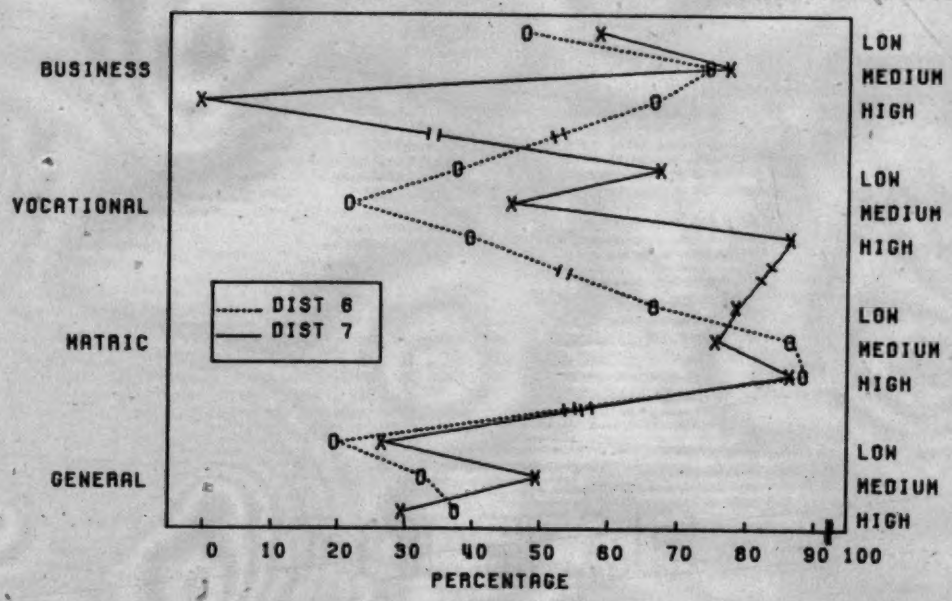
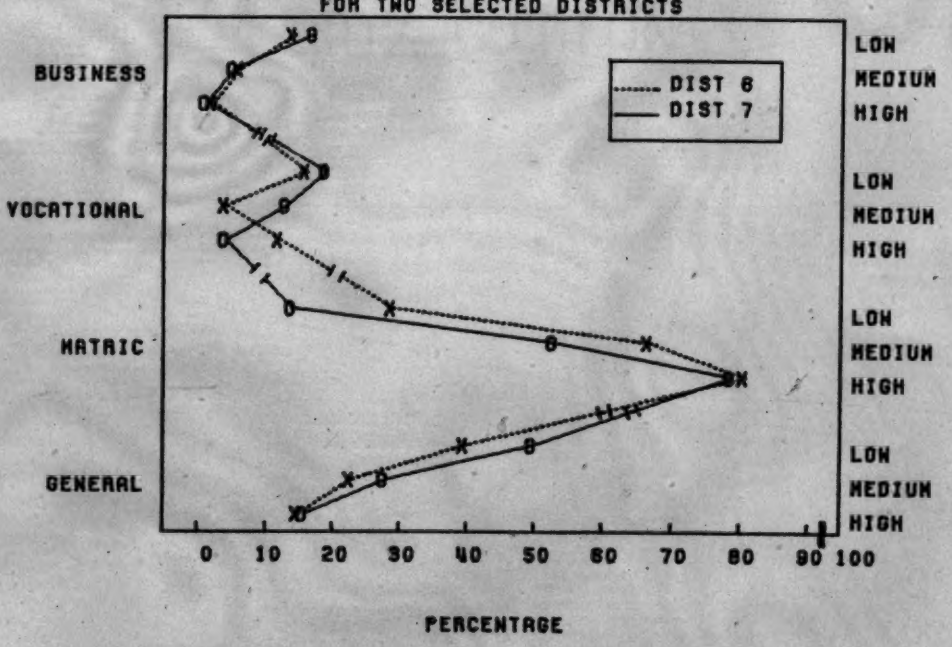


Figure 13

ENROLLMENT WITHIN PROGRAM BY PRIOR ACHIEVEMENT
FOR TWO SELECTED DISTRICTS



12 reveals, District 7 had higher percentages of students complete a diploma from the low and middle groups, but fell far behind District 6 for the high achievement group.

In the Vocational program, as Figure 13 reveals, District 7 enrolled higher percentages of the low and middle prior achievement students and fewer of the high. Figure 12 shows notably higher percentages (20% to 40%) of the students within the Vocational program achieving a diploma in District 7 than in District 6.

As Figure 13 reveals, fewer students were enrolled in the Matriculation program within District 7, especially from the lower achievers. Figure 12 however, reveals the percentages achieving a diploma were higher than District 6 for the low achievement group but less for the middle and close to the same for the high prior achiever.

The General program enrollment percentages were higher for all three achievement groups in District 7, as revealed in Figure 13. Comparison of the profile in Figure 12 however, shows what appears to be a consistent finding over all four programs, namely, a higher percentage of lower achievers completing a high school diploma.

The primary purpose of the analysis and report of findings associated with sub-problems 4, 5, and 6, of the study was to illustrate the types of information which could be gleaned from the macro evaluations using the various indicators of educational quality. For this reason, only selected analyses were undertaken and selected findings reported in the previous chapter and in this summary chapter. A detailed presentation of all the possible analyses which could have been undertaken in the present study was not intended.

Conclusions

Conclusions have been identified for each of the two phases of the study.

Inductive Inquiry Phase

The following points are presented with reference to the inductive inquiry phase:

1. The list of indicators of educational quality identified in the present study, while perhaps incomplete in the ideal sense of being mutually exclusive yet comprehensive, represents an important step toward this ideal because of the low statistical overlap among indicators and the theoretical soundness of them.
2. The school program chosen and hence the type of school experience undergone by students would seem to have a significant impact on achievements within school as well as on later career achievements.
3. Sex of the student was found to be associated with in-school achievements and, to some degree, with career outcomes.
4. Student ability was closely associated with both internal and external outcomes of schooling, but prior achievement scores proved to be better predictors than did the more ability orientated T-SCAT scores.
5. Many of the features of schools which are generally assumed to be related to educational effectiveness such as pupil-teacher ratio, school size, types of programs offered, etc., were found to have low association with variance in the quality indicators examined in the present study.

6. With the use of the theoretical model selected for the study and by focusing on only the most promising antecedent and transactional variables, significant levels of association were found with the quality indicators identified. Further research and sophistication of the techniques utilized shows promise of worthwhile results.

Information Phase

The following points were identified with respect to the information phase of the study:

1. Significant numbers of students were still not completing secondary education (35%) in 1973.
2. Goals associated with the "back to the basics" curricular areas, such as the development of basic competencies, use of information, and communication skills (goals 1, 2, and 3) were among those evaluated as having been most adequately achieved.
3. The needs of the low achievement student appear to be inadequately met (low diploma completion rates, low credits achieved, low participation in subject area offerings) except for those few students who follow either a Business or Vocational program. The Mathematics and Science courses showed particularly low ratings in reference to the low achievement group.
4. Enrollments in the Fine Arts courses appear to be very low which may account for the overall low evaluation of the educational goals which tend to reflect these subject areas.
5. Though few students followed a Business Education program, a large number of students took at least one course from those

offerings.

6. The Physical Education curricular area stands out from the other subject areas in the number of students it serves, with relatively few failures, and high evaluative feedback regarding the achievement of subject area objectives.

Summation

Based on the above more specific conclusions, a major conclusion can be stated for this exploratory research, namely, that macro evaluations of school programs of the type demonstrated by this study have potential in providing useful information for school program planners and educational decision makers at the general level. While the importance of the specific findings of the study may be questioned because they are time specific, the periodic availability of the type of information identified could be useful in assisting the educational decision makers to improve the general quality of education. An additional advantage of this approach is the continuing dialogue with the public, as ex-clients of the schools and present financial supporters. Public information regarding the quality of education in various respects, provided on a periodic basis would be one approach to offsetting unfounded and biased speculation which is often advanced in the absence of systematically collected data.

Implications

Possible implications of this study have been identified with reference to practice, theory, and research.

Practice

The following implications are identified with respect to practice:

1. If curricular goals and objectives are to be used as a structure for feedback on the quality of education, curriculum planners need to continue refining the wording of these statements to ensure a common understanding of the meaning by both the professional and the lay person.
2. School administrators need to examine more closely their policies and procedures in packaging groups of courses for students and in counselling students into certain programs, in order to ensure that student programs (groups of courses) are available to the type of student who appears to benefit from them.
3. A high school program may be an entirely different set of experiences for one student than for another; therefore evaluators of schools need to differentiate evaluative feedback, collected from students and the community, based on the type of student program being referred to by the respondent. The importance of such differentiation has been demonstrated by this study through showing the degree of association of the student program variable with variance in the indicators of quality education.
4. There would seem to be a need for school administrators to focus more on the components of their school offerings experienced by students, and less on traditional institutional characteristics such as pupil-teacher ratio.
5. School curricula need to be improved particularly in the areas of

preparation for work, leisure time, appreciation of culture, and good citizenship. Curricula in the areas of the development of basic competencies, communication skills, and how to use information, are strong in relation to the other goal areas.

6. In light of the low ratings on the adequacy of objective achievement, an in-depth evaluation would seem required of the Second Languages program, including a close examination of the viability and understandability of the present objectives.
7. Curriculum evaluation would seem to be required in the "general" courses, particularly in Mathematics and Science, which seem to be serving fewer students than, for example, the general English courses, and awarding greater percentages of low and failing grades to those who do enroll.
8. Examination of grading practices throughout the province may be advisable, in light of the aforementioned high percentages of low grades awarded in Mathematics and Science and those in Social Studies as well. At the other end, by contrast, extremely high average marks were evidenced in the Music area.
9. A very critical examination of the General program is required, especially for the low achievement student. Schools need to determine why students follow this route, why it is not meeting their needs as evidenced by the low percentage of completions, and what alternatives should be considered in order to better meet the needs of this large group of students.
10. More emphasis needs to be placed on providing expanded Business and Vocational programs, especially for the low prior achiever, as the findings have shown a combination of high completion

rates, high ratings on external indicators, and high ratings on the achievement of objectives by students enrolled in these programs.

11. Closer attention needs to be paid to the quality indicators associated with individual school units, including enrollment practices and program outcomes, in order to identify units which may require more indepth evaluation to determine why there appears to be a low quality of education provided. Close examination of those units with high ratings on the quality indicators may also reveal factors which should be considered for adoption by other school units.

Theory

The implications of this study for evaluation theory generally fall in two main areas. First, the use of the inductive inquiry phase, identifying independent variables which show the most potential for examination in greater detail, has shown some level of success and requires further development. Second, the considerable variance accounted for by the student program variable suggests an increased emphasis on identifying the process components in any program evaluation, where the components may differ, and disaggregating the outcome data based on the categorizations that may be developed from such examination. While most evaluation models that are based on systems theory do identify process as one focus of evaluation, further development of this area should result in fewer oversights in the application of these models.

The model for monitoring an educational system which was tested

by this study, requires further development in at least two major areas. While the data base for an educational monitoring system must be based on the student, as the user of the system, nevertheless evaluative sources must be expanded to include the professionals involved as well as the parents of the students. In addition, the indicators developed were either averages or percentages. Further development of the model should explore the combination of two or more variables, producing "rates" and "ratios" as a second level set of indicators. The identification of areas requiring development would result from a second similar attempt, which would identify areas of theoretical concern as a result of discrepencies in the findings of two comparable studies. Attention also needs to be directed toward the possibility of more explicitly recognizing the place of macro qualitative data of a descriptive nature, which may be required to supplement the quantitative emphasis provided in the model.

Research

The following implications for further research are identified:

1. Further research needs to be undertaken on the question of whether variables other than outcomes (i.e. antecedent or transactional) could be included as quality indicators if they were shown consistently to be associated with desired outcomes. Such findings may alter the initial position adopted within this study that only outcome variables be considered as indicators of quality education.
2. The quality indicators identified in this study need to be tested by replication and by comparison with other indicators of

educational quality. Further research should seek to add additional indicators not covered in this study.

3. Further research needs to focus on the definition of student program identifying the curricular components of "schooling" as experienced by different groups of students.
4. Since the characteristics of schools used within this study did not show close association with any of the quality indicators, yet schools and even school districts were shown to be associated with variance in the indicators, further research needs to be undertaken in order to identify the features of the schools and school districts which may contribute to the differences in the quality of education.
5. There is a need to emphasize research with regard to the long range impact of educational programs. Few of the antecedent or transactional variables included in this study showed measurable amounts of association. Indeed, even the quality indicators (outcomes) taken from school records showed low levels of association with the career outcome measures or the ex-student evaluation of goal achievement. This would seem to indicate that the current measures used within the school to evaluate the progress of students do not coincide with the achievement of our stated goals, at least as envisaged by our former students.
6. On-going, periodic research is required to update provincial norms and identify potential trends for the quality indicators identified in this study, and to identify additional indicators of quality education.
7. In-depth research is required in order to establish the nature of

the relationship between student evaluations of course objectives and the more objective measures of skill development and knowledge attainment within the subject areas.

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APPENDIX A: Listing of CEP Variables

Listing Of CEP Variables

From Departmental Records:

Variable	Description
V1	Sex
V2	Grade 9 V-SCAT
V3	Grade 9 Q-SCAT
V4	Grade 9 T-SCAT
V5	Grade 9 Departmental Average
V6	High School Credit Attainment
V7	Grade XI Program - 4 way Categorization
V8	Grade XI Program - 15 way Categorization
V9	Grade X Average
V10	High School Average
V11	Grade XI School - Total Credits Offered
V12	Grade XI School - Enrollment
V13	Grade XI School - Number of Teachers
V14	Grade XI School - School Type
V15	Grade XI School - Rural/Urban/Suburban
V16	Grade XI School - School Code
V17	Grade XI School - Pupil-Teacher Ratio
V18	Grade XI School - No of Counsellors
V19	Grade XI School - Type of Term

From Questionnaire One:

Variable	Description
V20	Age
V21	Father's Education
V22	Mother's Education
V23	Intelligence Self-Perception
V24	Courses chosen
V25 - V35	Course Pattern Requested
V36 - V46	Reasons For Course Pattern Requested
V47 - V57	Course Patterns in Which Enrollment Did Not Occur
V58 - V68	Reasons For Not Enrolling In Marked Courses
V69 - V79	Who Influenced Course Pattern Choice
V80 - V90	Reasons For Dropping Courses
V91 - V101	Extent Of Course Contribution To Understanding Occupational Activities After Leaving School
V102 - V112	Extent Of Course Contribution To Preparation For Leisure Time Activities
V113 - V123	Course Choices If Starting Grade XI Over
V124 - V134	Teaching Method Most Often Used (By Subject)
V135	Plans To Finish High School
V136	Reasons If Planning To Leave School
V137	Plans On Leaving School
V138	Who Influenced Decisions
V139	Parents Educational Plans For Respondents
V140	Parents Plans For Respondents After High School
V141	Does School Have A Guidance Counsellor
V142	Career Help Sought From

V143	Importance Of Information Provided By School In Occupational Choice
V144	Importance Of School In Preparing Leisure Time Activities
V145	Importance Of School In Preparing Occupational Skills
V146	Career Decision Made
V147	Membership In School Organizations
V148	Membership In Out Of School Organizations
V149 - V158	Learning Activities Evaluation
V159 - V172	Evaluation Of Features In School
V173	Work Experience Course Credit
V174	Contribution Of Work Experience Course In Education
V175	Participation In Special Project For Credit
V176	Evaluation Of Special Project Experience

From Questionnaire Two:

Variable	Description
V177 - V187	Contribution Of Course Patterns In Understanding Occupational Activities
V188 - V198	Contribution Of Course Patterns In Preparation For Leisure Time Activities
V199 - V209	Course Pattern Chosen If Starting Grade 11 Again
V210	Finished Grade 12
V211	Plans For Finishing Grade 12
V212	Plans For Leaving School Before Completing Grade 12
V213	Importance Of Education
V214	Current Status
V215	Who Has Had Most Influence
V216	People Asked For Career Help
V217	Importance Of Information In Career Choice
V218	Importance Of School In Preparation For Leisure Time Activities
V219	Importance Of School In Occupational Skills
V220	Decision On Career
V221 - V230	Importance Of Learning Activities In Helping You Learn
V231 - V244	Area Ratings Of Last School Attended
V245	Importance Of Work Experience Course
V246	Importance Of Special Project Credits
V247	Time To First Job After Leaving High School
V248	Difficulty In Obtaining First Job
V249	Help In Finding First Job
V250	Participation In Study In Two Years

From Questionnaire Three:

Variable	Description
V251	Educational Programs Involved In
V252	Education Since High School
V253	Current Occupational Status

V254	Employment Type
V255	Status Of The Industry
V256	Current Wage Bracket
V257	Distance From High School Attended
V258	Satisfaction Of Career
V259	Time Elapsed Before First Employment
V260	Relationship Of Present Vocation To Previous Plans
V261	Reasons For Leaving School Before Completing Grade 12
V262	Career Help Sought From
V263 - V273	Courses Chosen If Starting Grade 12 Again
V274	Occupation Chosen If Starting Career Again
V275	Business, Service, Industry
V276 - V309	Achievement Of General Aims
V310 - V372	Achievement Of Subject Area Aims
V373 - V380	General High School Experience
V381 - V444	Importance Of Subject Area Aims

APPENDIX B: CEP Followup Questionnaire

INFORMATION SECTION

In this first section we seek information about yourself since you left school. Please circle the number opposite the appropriate response.

1. What type of educational programs have you been involved in since leaving school?
(Circle One Number)

None 1
University 2
College 3
Institute of Technology 4
Apprenticeship 5
Other 6

2. How many years of education have you completed since leaving high school?
(Circle One Number)

None 1
One year 2
Two years 3
Three years 4
Four or more years 5

3. What is your current occupational status ?
(Circle One Number)

Unemployed:
(a) actively seeking employment 1
(b) not seeking employment 2
Student 3
Employed (fill in blanks below) 4
employed as a _____ (job)
in the _____ business;
industry, or service.
(include homemaking under employed)

4. What is your current wage bracket?
(Circle One Number)

Up to $8,000 1
$8,001 to $12,000 2
$12,001 to $15,000 3
$15,001 and over 4

5. How far do you now live from the place where you received the major part of your high school education?
(Circle One Number)

0 to 25 miles 1
25 to 100 miles 2
100 to 200 miles 3
over 200 miles 4

6. How satisfied are you with the present progress of your career?
(Circle One Number)

Very satisfied 1
Satisfied 2
Moderately satisfied 3
Only slightly satisfied 4
Not satisfied at all 5

7. How long from the time you left school did it take you to find your first employment?
(Circle One Number)

0 to 1 month 1
1 to 2 months 2
2 to 3 months 3
3 to 4 months 4
more than 4 months 5

8. Is your present vocation related to what you had planned during your high school years?
(Circle One Number)

Yes 1
Moderately 2
Slightly 3
Not at all 4

9. If you left school before completing grade 12, why?
(Circle One Number)

To get a job 1
Poor marks 2
To get married 3
Financial problems 4
Dislike for school work 5

10. If you were still in school, which of these people would you now ask for help in deciding a career?
(Circle One Number)

Friends 1
Teacher 2
Parents 3
Guidance Counsellor 4
Principal 5
Other (Specify) _____ 6

11. If you could start grade eleven all over again, in which courses would you now register?
(Circle As Many Numbers As Necessary)

Business Education 1
Technical or Vocational Education 2
English 3
Fine Arts 4
Social Studies 5
Home Economics 6
Mathematics 7
Industrial Arts 8
Science 9
Physical Education 10
Modern Languages 11

12. If you could start your work career again, what occupation would you chose?
A _____ (job) in the
_____ business, industry, or service.

2

HOW ADEQUATELY DO ALBERTA HIGH SCHOOLS ACHIEVE THEIR GENERAL AIMS?

This section presents some of the general "aims" that have been established for Alberta high schools. (Not all of the aims are listed.)
These aims, identified by the Department of Education, are general statements of what should be learned by students.
How adequately did your high school program meet these general aims for you?

Directions:
1. Consider each aim listed below and circle the appropriate letters indicating your opinions of the adequacy of your education in regards to that aim.

	VERY ADEQUATE	ADEQUATE	NOT ADEQUATE	A DEFINITE NEED	DON'T KNOW
Develop the ability to use information and counselling services related to career decisions.	VA	A	NA	DN	DK
Develop skills in managing natural, financial and human resources.	VA	A	NA	DN	DK
Develop an understanding of functions, responsibilities and achievements of various societal institutions.	VA	A	NA	DN	DK
Develop special interests and abilities.	VA	A	NA	DN	DK
Develop a positive attitude toward learning.	VA	A	NA	DN	DK
Develop an understanding of good physical and mental health practices.	VA	A	NA	DN	DK
Develop ability to apply scientific methods in the pursuit of and analysis of knowledge.	VA	A	NA	DN	DK
Develop an attitude of respect for public and private property.	VA	A	NA	DN	DK
Establish sound personal health habits.	VA	A	NA	DN	DK
Develop a feeling of cultural identity and heritage at national and international levels.	VA	A	NA	DN	DK
Develop a positive attitude toward participation in a range of leisure time activities - physical, intellectual and creative.	VA	A	NA	DN	DK
Cultivate appreciation for beauty in various forms.	VA	A	NA	DN	DK
Develop an awareness of and the ability to adjust to a changing social and physical environment.	VA	A	NA	DN	DK
Develop ability to adjust to the changing demands of Canadian society.	VA	A	NA	DN	DK
Develop an awareness of civic rights and responsibilities.	VA	A	NA	DN	DK
Develop intellectual curiosity and eagerness for lifelong learning.	VA	A	NA	DN	DK
Establish a good physical fitness program.	VA	A	NA	DN	DK

Our School Systems Need Your Opinions - Please Continue

HOW ADEQUATELY DO ALBERTA HIGH SCHOOLS ACHEIVE THEIR GENERAL AIMS?

This section presents some of the general "aims" that have been established for Alberta high schools. (Not all of the aims are listed.)
These aims, identified by the Department of Education, are general statements of what should be learned by students.
How adequately did your high school program meet these general aims for you?

Directions:
1. Consider each aim listed below and circle the appropriate letters indicating your opinions of the adequacy of your education in regards to that aim.

	VERY ADEQUATELY	ADEQUATELY	NOT ADEQUATELY	DON'T KNOW
Develop understanding of the past, identify with the present and the ability to meet the future.	VA	A	NA	DK
Develop an understanding of the Canadian and other forms of government.	VA	A	NA	DK
Develop interests which will lead to a wise and satisfying use of leisure time.	VA	A	NA	DK
Develop an understanding of the obligation and responsibilities of Canadian and world citizenship.	VA	A	NA	DK
Develop appreciation and respect for the worth and dignity of individuals.	VA	A	NA	DK
Develop an understanding of economic principles and responsibilities.	VA	A	NA	DK
Develop creative self-expression through various media including the fine and practical arts.	VA	A	NA	DK
Develop understanding and skills in the use of numbers, natural sciences, mathematics and social sciences.	VA	A	NA	DK
Develop skill in oral and written languages.	VA	A	NA	DK
Develop a fund of information and concepts.	VA	A	NA	DK
Develop skills of thinking and proceeding logically.	VA	A	NA	DK
Develop ability in communicating ideas and feelings.	VA	A	NA	DK
Develop special talents in the arts.	VA	A	NA	DK
Learn to take into account the values of others when making personal choices.	VA	A	NA	DK
Develop skill in understanding the communication of others.	VA	A	NA	DK
Develop ability to organize information into meaningful categories.	VA	A	NA	DK
Develop skills basic to the world of work.	VA	A	NA	DK

Our School Systems Need Your Opinions - Please Continue

3

HOW ADEQUATELY DO ALBERTA SCHOOLS ACHEIVE THE AIMS OF THE VARIOUS SUBJECT AREAS?

This section lists the "aims" that have been established for each subject area offered by Alberta high schools.
These aims, identified by the Department of Education, are statements of what should be learned by students in each subject area.
How adequately did your high school program meet these subject area aims for you?

Directions:
1. Check each subject area in which you took at least one course.
2. For each subject area checked, circle the appropriate letters indicating the adequacy of your education in regards to each stated aim.

	VERY ADEQUATE	ADEQUATE	NOT ADEQUATE	DON'T KNOW
Art				
To develop an appreciation of artistic design.	VA	A	NA	DK
To develop an understanding of past and present art.	VA	A	NA	DK
To apply artistic design principles in art and everyday living.	VA	A	NA	DK
To develop individual artistic skills.	VA	A	NA	DK
Business Education				
To develop an understanding of the operation of a business.	VA	A	NA	DK
To develop useful business knowledge and skills.	VA	A	NA	DK
To develop business skills of individual interest.	VA	A	NA	DK
To develop individuality in thought and action.	VA	A	NA	DK
To develop problem solving abilities.	VA	A	NA	DK
To apply business skills to other areas.	VA	A	NA	DK
To give practical experience in the application of business skills.	VA	A	NA	DK
Drama				
To develop concentration.	VA	A	NA	DK
To develop sensory distinction.	VA	A	NA	DK
To obtain freedom and control in physical movement.	VA	A	NA	DK
To encourage further interest in drama.	VA	A	NA	DK
To communicate, through drama, an awareness of the current world issues.	VA	A	NA	DK
Industrial Education				
To develop skills for entry into an occupation.	VA	A	NA	DK
To provide practical application of academic knowledge.	VA	A	NA	DK
To develop basic skills to enter either a job or a post high school institution.	VA	A	NA	DK
To develop appropriate attitudes and work habits.	VA	A	NA	DK

	VERY ADEQUATE	ADEQUATE	NOT ADEQUATE	DON'T KNOW
1 1 Language Arts				
To develop the ability to communicate clearly in speech and writing. .	VA	A	NA	DK
To develop an understanding of language arts for personal enjoyment. .	VA	A	NA	DK
To develop a personal value system through examination of the value systems of others.	VA	A	NA	DK
To appreciate style changes in the English language.	VA	A	NA	DK
1 1 Second Language				
To develop an understanding of the people whose language is studied. .	VA	A	NA	DK
To appreciate the contributions of the people whose language is studied.	VA	A	NA	DK
To understand the structure and use of the language.	VA	A	NA	DK
To understand the language when spoken at a normal speed.	VA	A	NA	DK
To speak the language well enough to communicate.	VA	A	NA	DK
To read in the target language with understanding.	VA	A	NA	DK
To write anything one can say in the language.	VA	A	NA	DK
1 1 Mathematics				
To appreciate the contribution of mathematics to progress.	VA	A	NA	DK
To develop precision in thought and expression.	VA	A	NA	DK
To understand and apply mathematical operations and concepts.	VA	A	NA	DK
To develop the ability to understand and solve a problem.	VA	A	NA	DK
1 1 Music				
To develop an appreciation of music past and present.	VA	A	NA	DK
To understand ways of communicating through music, ...	VA	A	NA	DK
To recognize ones' own musical abilities.	VA	A	NA	DK
To become aware of the basic importance of music in life.	VA	A	NA	DK
To increase ones' self-confidence.	VA	A	NA	DK
1 1 Physical Education				
To develop a strong body.	VA	A	NA	DK
To develop recreational skills.	VA	A	NA	DK
To develop an interest in physical activities for leisure time.	VA	A	NA	DK
To develop the ability to get along well with others.	VA	A	NA	DK

5

	VERY ADEQUATE	ADEQUATE	NOT ADEQUATE	DON'T KNOW
1 1 Science				
To understand the role of science in societies' development.	VA	A	NA	DK
To understand moral and ethical problems in science.	VA	A	NA	DK
To understand social problems that are either caused, or solved through science.	VA	A	NA	DK
To understand and use scientific methods.	VA	A	NA	DK
To learn fundamental scientific ideas.	VA	A	NA	DK
To develop scientific attitudes, interests, and values.	VA	A	NA	DK
To connect scientific knowledge with vocational skills and opportunities.	VA	A	NA	DK
1 1 Social Sciences				
To understand basic social science concepts.	VA	A	NA	DK
To understand modes of inquiry and skills unique to the social sciences.	VA	A	NA	DK
To understand how knowledge is produced in a particular discipline. ..	VA	A	NA	DK
1 1 Social Studies				
To develop an ability to choose from all known alternatives.	VA	A	NA	DK
To defend ones' choice of alternatives.	VA	A	NA	DK
To take action on the chosen alternatives.	VA	A	NA	DK
To develop an awareness of values.	VA	A	NA	DK
To choose among a variety of values.	VA	A	NA	DK
To develop a consistent, defensible system of values based on those choices.	VA	A	NA	DK
To recognize information relevant to social problems.	VA	A	NA	DK
To use information to propose a solution to social problems.	VA	A	NA	DK
To respond to the feelings and ideas of others without compromising individual value system.	VA	A	NA	DK

APPENDIX C: Detailed Description of Variables from CEP Data Bank

DETAILED DESCIPTION OF VARIABLES SELECTED FROM CEP DATA BANK

"General" Outcome Variables - External

(Source: Followup questionnaire in 1977)

These variables are general in the sense of applying to the high school curriculum as a whole, rather than specific subject areas. They are external in the sense of being collected after the student has left the institution, via a followup questionaire five years after leaving school.

a. Student report of educational and career achievements: (n=725)

V1 - Type of further education programs involved in.

V2 - Number of years of further education.

V3 - Employment status.

V4 - Type of employment.

V5 - Status of industry employed in.

V6 - Wage bracket.

V7 - Level of satisfaction with career.

b. Student-client evaluation of the adequacy of the school program generally, in reference to the achievement of provincial curriculum goals: (n=725/2).

V8 - Evaluation of: "Develop the ability to use information and counselling services related to career decisions."

V9 - Evaluation of: "Develop skills in managing natural, financial and human resources."

V10 - Evaluation of: "Develop an understanding of functions, responsibilities and achievements of various societal institutions."

V11 - Evaluation of: "Develop special interests and abilities."

V12 - Evaluation of: "Develop a positive attitude toward learning."

V13 - Evaluation of: "Develop an understanding of good physical and mental health practices."

V14 - Evaluation of: "Develop ability to apply scientific

methods in the pursuit of and analysis of knowledge."

V15 - Evaluation of: "Develop an attitude of respect for public and private property."

V16 - Evaluation of: "Establish sound personal health habits."

V17 - Evaluation of: "Develop a feeling of cultural identity and heritage at national and international levels."

V18 - Evaluation of: "Develop a positive attitude toward participation in a range of leisure time activities - physical, intellectual and creative."

V19 - Evaluation of: "Cultivate appreciation for beauty in various forms."

V20 - Evaluation of: "Develop an awareness of and the ability to adjust to a changing social and physical environment."

V21 - Evaluation of: "Develop ability to adjust to the changing demands of Canadian society."

V22 - Evaluation of: "Develop an awareness of civic rights and responsibilities."

V23 - Evaluation of: "Develop intellectual curiosity and eagerness for lifelong learning."

V24 - Evaluation of: "Establish a good physical fitness program."

V25 - Evaluation of: "Develop understanding of the past, identify with the present and the ability to meet the future."

V26 - Evaluation of: "Develop an understanding of the Canadian and other forms of government."

V27 - Evaluation of: "Develop interests which will lead to a wise and satisfying use of leisure time."

V28 - Evaluation of: "Develop an understanding of the obligation and responsibilities of Canadian and world citizenship."

V29 - Evaluation of: "Develop appreciation and respect for the worth and dignity of individuals."

V30 - Evaluation of: "Develop an understanding of economic principles and responsibilities."

V31 - Evaluation of: "Develop creative self-expression through various media including the fine and practical arts."

V32 - Evaluation of: "Develop understanding and skills in the use of numbers, natural sciences, mathematics and social sciences."

V33 - Evaluation of: "Develop skill in oral and written languages."

V34 - Evaluation of: "Develop a fund of information and concepts."

V35 - Evaluation of: "Develop skills of thinking and proceeding logically."

V36 - Evaluation of: "Develop ability in communicating ideas and feelings effectively."

V37 - Evaluation of: "Develop special talents in the arts."

V38 - Evaluation of: "Learn to take into account the values of others when making personal choices."

V39 - Evaluation of: "Develop skill in understanding the communication of others."

V40 - Evaluation of: "Develop ability to organize information into meaningful categories."

V41 - Evaluation of: "Develop skills basic to the world of work."

"General" Outcome Variables - Internal

(Source: Analysis of Dept. of Education student records)

These variables are internal in the sense of being collected while the student is still within the institution.

V42 - Average of high school marks.

V43 - Level of high school achievement.

V44 - High school credit total.

V45 - Achievement of "100-credit" requirement for high school diploma.

V46 - Achievement of "English" requirement for high school diploma.

V47 - Achievement of "Social Studies" requirement for high school diploma.

V48 - Achievement of "Mathematics" requirement for high school diploma.

V49 - Achievement of "Physical Education" requirement for high school diploma.

V50 - Achievement of "Science" requirement for high school diploma.

V51 - Achievement of "senior course" requirement for high school diploma.

"Student Based" Transactional Variables

(Source: analysis of Dept. of Education student records)

These variables are descriptive of the "process" or educational experience of the student in terms of courses taken. Variables collected were categorizations based on clustering of students according to their similarity of school program.

V52 - Type of high school program followed (4 categorizatons).

V53 - Type of high school program followed (15 categorizations).

V54 - Type of high school program followed (9 categorizations).

"Institution Based" Transactional Variables

(Source: Analysis of school "A" cards)

These variables are descriptive of school characteristics attended by the students in the sample. These variables relate to the on-going operation of schools, but for the purposes of this study have been delimited to variables which have potential for change through School Board level policy or resource allocation decisions. Such variables are used for the purposes of dissaggregating outcome variables and where relationships can be established, may be used as a "third level" quality indicator.

V55 - School size: credits offered.

V56 - School size: student enrollment.

V57 - Number of teachers in school.

V58 - Pupil-teacher ratio of school.

V59 - Number of counsellors in school.

V60 - Type of school, based on programs offered.

V61 - Type of term offered.

"Student Based" Antecedent Variables

(Source: Dept. of Education student records)

These variables are considerd as "givens" to the school and not subject to change by policy or curriculum changes.

V62 - Student year of birth.

V63 - Sex of student.

V64 - Grade nine ability as measured by the Verbal SCAT score.

V65 - Grade nine ability as measured by the Quantitative SCAT score.

V66 - Grade nine Total-SCAT score.

V67 - Grade nine departmental Reading score.

V68 - Grade nine departmental Literature score.

V69 - Grade nine departmental Language Arts score.

V70 - Grade nine departmental Social Studies score.

V71 - Grade nine departmental Mathematics score.

V72 - Grade nine departmental Science score.

V73 - Average of grade nine departmentals.

V74 - Student self ability rating.

V75 - SES as measured by student report of father's educational level.

V76 - SES as measured by student report of mother's educational level.

V77 - Student report of having made a career decision or not.

V78 - Student report of future educational and career plans.

"Institution Based" Antecedent Variables

(Source: analysis of school "A" cards)

These variables identify the school, school district and categorizations of provincial regions.

V79 - Geographic region of school.

V80 - Urban, small urban, or rural school.

V81 - Code of school attended.

V82 - Code of school district, division or county attended.

"Subject Area" Outcome Variables - External

(Source:followup questionnaire in 1977)

These variables focus on subjective evaluations of the achievement of objectives by each of the subject areas within the provincial high school curriculum.

V83 - Evaluation of Art objective: "To develop an appreciation of artistic design.

V84 - Evaluation of Art objective: "To develop an understanding of past and present art."

V85 - Evaluation of Art objective: "To apply artistic design principles in art and everyday living."

V86 - Evaluation of Art objective: "To develop individual artistic skills."

V87 - Evaluation of Business Education objective: "To develop an understanding of the operation of a business."

V88 - Evaluation of Business Education objective: "To develop useful business knowledge and skills."

V89 - Evaluation of Business Education objective: "To develop business skills of individul interest."

V90 - Evaluation of Business Education objective: "To develop individuality in thought and action."

V91 - Evaluation of Business Education objective: "To develop problem solving abilities."

V92 - Evaluation of Business Education objective: "To apply business skills to other areas."

V93 - Evaluation of Business Education objective: "To give practical

experience in the application of business skills."

V94 - Evaluation of Drama objective: "To develop concentration."

V95 - Evaluation of Drama objective: "To develop sensory distinction."

V96 - Evaluation of Drama objective: "To obtain freedom and control in physical movement."

V97 - Evaluation of Drama objective: "To encourage further interest in drama."

V98 - Evaluation of Drama objective: "To communicate, through drama, an awareness of the current world issues."

V99 - Evaluation of Industrial Education objective: "To develop skills for entry into an occupation."

V100 - Evaluation of Industrial Education objective: "To provide practical application of academic knowledge."

V101 - Evaluation of Industrial Education objective: "To develop basic skills to enter either a job or a post high school institution."

V102 - Evaluation of Industrial Education objective: "To develop appropriate attitudes and work habits."

V103 - Evaluation of Language Arts objective: "To develop the ability to communicate clearly in speech and writing."

V104 - Evaluation of Language Arts objective: "To develop an understanding of language arts for personal enjoyment."

V105 - Evaluation of Language Arts objective: "To develop a personal value system through examination of the value systems of others."

V106 - Evaluation of Language Arts objective: "To appreciate style changes in the English language."

V107 - Evaluation of Second Language objective: "To develop an understanding of the people whose language is studied."

V108 - Evaluation of Second Language objective: "To appreciate the contributions of the people whose language is studied."

V109 - Evaluation of Second Language objective: "To understand the structure and use of the language."

V110 - Evaluation of Second Language objective: "To understand the language when spoken at a normal speed."

V111 - Evaluation of Second Language objective: "To speak the language well enough to communicate."

V112 - Evaluation of Second Language objective: "To read in the target language with understanding."

V113 - Evaluation of Second Language objective: "To write anything one can say in the language."

V114 - Evaluation of Mathematics objective: "To appreciate the contribution of mathematics to progress."

V115 - Evaluation of Mathematics objective: "To develop precision in thought and expression."

V116 - Evaluation of Mathematics objective: "To understand and apply mathematical operations and concepts."

V117 - Evaluation of Mathematics objective: "To develop the ability to understand and solve a problem."

V118 - Evaluation of Music objective: "To develop an appreciation of music past and present."

V119 - Evaluation of Music objective: "To understand ways of communicating through music."

V120 - Evaluation of Music objective: "To recognize ones' own musical abilities."

V121 - Evaluation of Music objective: "To become aware of the basic importance of music in life."

V122 - Evaluation of Music objective: "To increase ones' self-confidence."

V123 - Evaluation of Physical Education objective: "To develop a strong body."

V124 - Evaluation of Physical Education objective: "To develop recreational skills."

V125 - Evaluation of Physical Education objective: "To develop an interest in physical activities for leisure time."

V126 - Evaluation of Physical Education objective: "To develop the ability to get along well with others."

V127 - Evaluation of Science objective: "To understand the role of science in societies' development."

V128 - Evaluation of Science objective: "To understand moral and ethical problems in science."

V129 - Evaluation of Science objective: "To understand social problems that are either caused, or solved through science."

V130 - Evaluation of Science objective: "To understand and use scientific methods."

V131 - Evaluation of Science objective: "To learn fundamental scientific ideas."

V132 - Evaluation of Science objective: "To develop scientific attitudes, interests, and values."

V133 - Evaluation of Science objective: "To connect scientific knowledge with covational skills and opportunities."

V134 - Evaluation of Social Sciences objective: "To understand basic social science concepts."

V135 - Evaluation of Social Sciences objective: "To understand modes of inquiry and skills unique to the social sciences."

V136 - Evaluation of Social Sciences objective: "To understand how knowledge is produced in a particular discipline."

V137 - Evaluation of Social Studies objective: "To develop an ability to choose from all known alternatives."

V138 - Evaluation of Social Studies objective: "To defend ones' choice of alternatives."

V139 - Evaluation of Social Studies objective: "To take action on the chosen alternatives."

V140 - Evaluation of Social Studies objective: "To develop an awareness of values."

V141 - Evaluation of Social Studies objective: "To choose among a variety of values."

V142 - Evaluation of Social Studies objective: "To develop a consistent, defensible system of values based on those choices."

V143 - Evaluation of Social Studies objective: "To recognize information relevant to social problems."

V144 - Evaluation of Social Studies objective: "To use information to propose a solution to social problems."

V145 - Evaluation of Social Studies objective: "To respond to the feelings and ideas of others without compromising individual value systems."

V146 - Art (N=305) mean rating.

V147 - Business Education (N=375)mean rating.

V148 - Drama (N=210) mean rating.

V149 - Industrial Education (N=288) mean rating.

V150 - Language Arts (N=590) mean rating.

V151 - Second Language (N=468) mean rating.

V152 - Mathematics (N=690) mean rating.

V153 - Music (N=208) mean rating.

V154 - Physical Education (N=660) mean rating.

V155 - Science (N=655) mean rating.

V156 - Social Sciences (N=343) mean rating.

V157 - Social Studies (N=660) mean rating.

"Subject Area" Outcome Variables - Internal

(Source: Analysis of Dept. of Education student records)

These variables are descriptive of individual student achievements within each of the subject areas.

V158 - Credits achieved in matriculation English.

V159 - Credits achieved in general English.

V160 - Credits achieved in Social Studies.

V161 - Credits achieved in Social Sciences.

V162 - Credits achieved in matriculation Mathematics.

V163 - Credits achieved in general Mathematics.

V164 - Credits achieved in matriculation Science.

V165 - Credits achieved in general Science.

V166 - Credits achieved in Second Languages.

V167 - Credits achieved in Art.

V168 - Credits achieved in Drama.

V169 - Credits achieved in Music.

V170 - Credits achieved in Physical Education.

V171 - Credits achieved in Business Education.

V172 - Credits achieved in Home Economics.

V173 - Credits achieved in Industrial Arts.

V174 - Credits achieved in Vocational Education.

V175 - Credits achieved in HPD.

V176 - Credits achieved in Occupations.

V177 - Credits achieved in Perspectives for Living.

V178 - Credits achieved in Driver Education.

V179 - Credits achieved in Religion.

V180 - Credits achieved in Special Projects.

V181 - Average of marks in matriculation English.

V182 - Average of marks in general English.

V183 - Average of marks in Social Studies.

V184 - Average of marks in Social Sciences.

V185 - Average of marks in matriculaton Mathematics.

V186 - Average of marks in general Mathematics.

V187 - Average of marks in matriculation Sciences.

V188 - Average of marks in general Sciences.

V189 - Average of marks in Second languages.

V190 - Average of marks in Art.

V191 - Average of marks in Drama.

V192 - Average of marks in Music.

V193 - Average of marks in Physical Education.

V194 - Average of marks in Business Education.

V195 - Average of marks in Home Economics.

V196 - Average of marks in Industrial Arts.

V197 - Average of marks in Vocational Education.

V198 - Average of marks in HPD.

V199 - Average of marks in Occupations.

V200 - Average of marks in Perspectives for Living.

V201 - Average of marks in Driver Education.

V202 - Average of marks in Religion.

V203 - Average of marks in Special Projects.

V204 - Grade distribution (A,B,C,D,F) in matriculation English.

V205 - Grade distribution (A,B,C,D,F) in general English.

V206 - Grade distribution (A,B,C,D,F) in Social Studies.

V207 - Grade distribution (A,B,C,D,F) in Social Sciences.

V208 - Grade distribution (A,B,C,D,F) in matriculation Mathematics.

V209 - Grade distribution (A,B,C,D,F) in general Mathematics.

V210 - Grade distribution (A,B,C,D,F) in matriculation Sciences.

V211 - Grade distribution (A,B,C,D,F) in general Sciences.

V212 - Grade distribution (A,B,C,D,F) in Second Languages.

V213 - Grade distribution (A,B,C,D,F) in Art.

V214 - Grade distribution (A,B,C,D,F) in Drama.

V215 - Grade distribution (A,B,C,D,F) in Music.

V216 - Grade distribution (A,B,C,D,F) in Physical Education.

V217 - Grade distribution (A,B,C,D,F) in Business Education.

V218 - Grade distribution (A,B,C,D,F) in Home Economics.

V219 - Grade distribution (A,B,C,D,F) in Industrial Arts.

V220 - Grade distribution (A,B,C,D,F) in Vocational Education.

V221 - Grade distribution (A,B,C,D,F) in HPD.

V222 - Grade distribution (A,B,C,D,F) in Occupations.

V223 - Grade distribution (A,B,C,D,F) in Perspectives for Living.

V224 - Grade distribution (A,B,C,D,F) in Driver Education.

V225 - Grade distribution (A,B,C,D,F) in Religion.

V226 - Grade distribution (A,B,C,D,F) in Special Projects.